

10¢ A COPY

APRIL 16, 1914

MOTOR AGE



The Name and The Guarantee

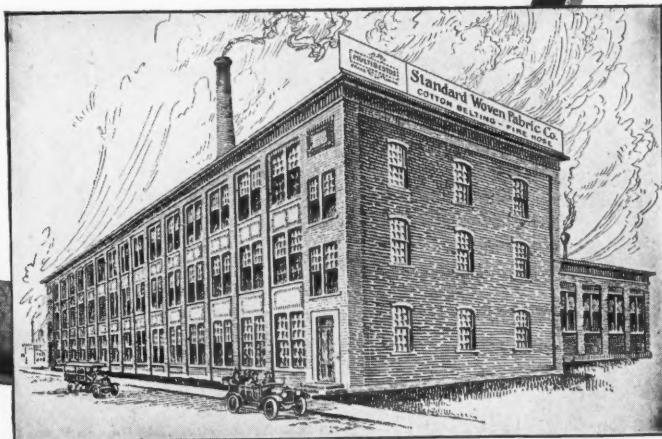
When we stamp MULTIBESTOS in bright bold letters on our brake lining we do more than provide for you a means of identifying MULTIBESTOS from other linings not so good.

We say to you: Here is a brake lining we are proud of; a brake lining we are glad to have you compare with any other under any condition of service; a brake lining which we as manufacturers stand back of with a most liberal guarantee.

This guarantee on which we have always sold MULTIBESTOS is liberal and without qualification or condition:

**"That every user of MULTIBESTOS shall be
satisfied without regard to cost or loss to us."**

This is real service guarantee
—a guarantee of satisfaction
to the large and growing
army of MULTIBESTOS
users.

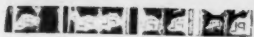


***"Safe in the grip
of Multibestos"***

Standard Woven Fabric Co.
Framingham, Mass.



BOSTON, 903 Boylston St.
NEW YORK, 276 Canal St.
CHICAGO, 1430 Michigan Boulevard.
PHILADELPHIA, 1427 Vine St.
SAN FRANCISCO, Corner First and
Howard Streets.



Safety First!

100%

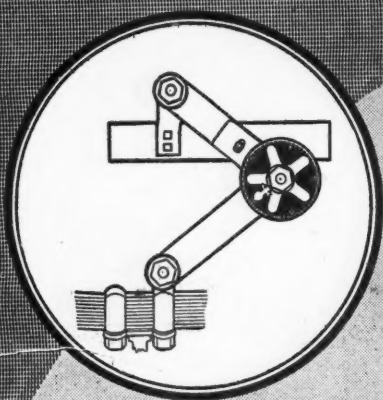
Factors of Safety Ball Bearings

"Factors of
Safety"

BRETZ
COMPANY
SOLE IMPORTERS

250 West Fifty-fourth, New York

Enjoy absolute comfort - and decrease your expense



PRICES—Five Models

Automatic	\$60
Standard	50
Intermediate	35
Ford	16
Junior	16

HARTFORD Auto Comfort EQUIPMENT

Hartford Electric Starting System
Hartford Electric Lighting System
Hartford Shock Absorber
Hartford Cushion Spring
Hartford Bumper
Hartford Jack

Comfort in a car depends largely on what *you call* comfort. Those car owners who have once used the

Truffault-Hartford **SHOCK ABSORBER**

"The Pioneer and the Best"

have a distinctly different idea of it from those who have not. Jolting, lurching, bumping finds no place in their riding no matter how rough the road—and then, there's the saving on upkeep and wear and tear.

MAKES ALL ROADS SMOOTH 'ROADS.

HARTFORD SUSPENSION CO.

E. V. HARTFORD, Pres.

Office and Works: 146 Bay Street, Jersey City, N. J.

Manufacturers of Hartford Electric Starting and Lighting System

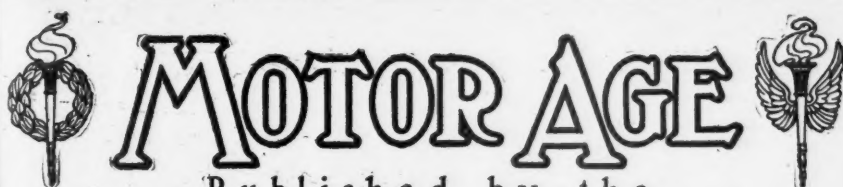
BRANCHES

New York—1700 Broadway
New York—212-214 West 88th St.
Boston—319-325 Columbus Ave.
Chicago—2637 Michigan Ave.
Jersey City—141-143 Morgan St.
Kansas City—1803 Grand Ave.
Indianapolis—425 No. Capitol Blvd.

DISTRIBUTORS

Chancellor & Lyon Co. Los Angeles
San Francisco Portland
Seattle Fresno
Spokane Oakland
Coughlin & Davis, Cincinnati, O.
L. Magranger & Co., 117 So. Beatty St., Pittsburg, Pa.
Pennsylvania Rubber & Supply Co., Cleveland, O.
Burnet & Chandler, 311 Halsey St., Newark, N. J.
Truffault-Hartford Agency, 1437 Vine St., Philadelphia, Pa.
Auto Accessory & Speedometer Co., Denver, Colo.

Rheinhard Bros. Co.,
Minneapolis, Minn.
John Millen & Son, Ltd.
Montreal
Toronto
Winnipeg
Vancouver
Victoria



Published by the
CLASS JOURNAL COMPANY
910 South Michigan Avenue
CHICAGO ILLINOIS

YEARLY SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions.....\$3.00
Canada and all Foreign Countries.....5.00

All currency should be sent by registered mail.
Two weeks should be allowed for change of address to become effective, or for receipt of first copy on a new subscription.
In forwarding change of address, please give old and new address.

BEWARE OF SOLICITORS OFFERING SUBSCRIPTIONS AT CUT RATES.

Volume XXV

APRIL 16, 1914

No. 16

C o n t e n t s

HOLDING FASHION'S MIRROR FOR THE MOTORIST.....	5
Modes for men and women for season of 1914 described and illustrated—Styles run to loose garments	
NEW INSURANCE RATES AFFECT DEALERS.....	11
Underwriters adopt 1914 code	
EDITORIAL—UNIFORMITY OF ROAD LAWS NEEDED—HUMAN STORAGE BATTERY.....	12
REVISING OF AMERICAN ROAD LAWS CONTEMPLATED.....	13
National movement to amend highway code started by different associations	
SEGREGATION OF VANDERBILT AND GRAND PRIX URGED.....	14
Tacoma and Seattle schedule speedway meets—Gossip concerning the Indianapolis 500-mile race	
FRENCH GRAND PRIX LISTS CLOSE WITH 41 ENTRIES.....	15
Six nations represented in European classic—Twenty-four nominations received for England's Isle of Man road race—Saxon engaged in unusual endurance test	
HEADLIGHT DIMMERS TAKEN UP BY ENGINEERS.....	18
S. A. E. makes light problem a national issue—Recent trade news	
ROUND THE WORLD WITH KEROSENE AS MOTOR FUEL.....	20
Part 3 of Edwin Kohl's globe-girdling adventures in a Henderson—Through Germany, Russia and Austria	
SPEEDY DELAGES AS TUNED UP FOR INDIANAPOLIS.....	28
French maker tells details of construction of cars he is sending to America	
MOTOR CAR DEVELOPMENT.....	31
Description of new Herff-Brooks	
INDEX TO ADVERTISEMENTS.....	110

DEPARTMENTS

Cyclecar Development.....	22	Among Makers and Dealers....	40
Readers' Clearing House.....	24	Recent Incorporations.....	40
Realm of Commercial Car.....	34	Brief Business Announcements.	42
The Accessory Corner.....	36	Coming Motor Events.....	42
From the Four Winds.....	38	Motor Car Repair Shop.....	44

The Plug

There were more Bosch Plugs sold during the month of March than ever before in one month.

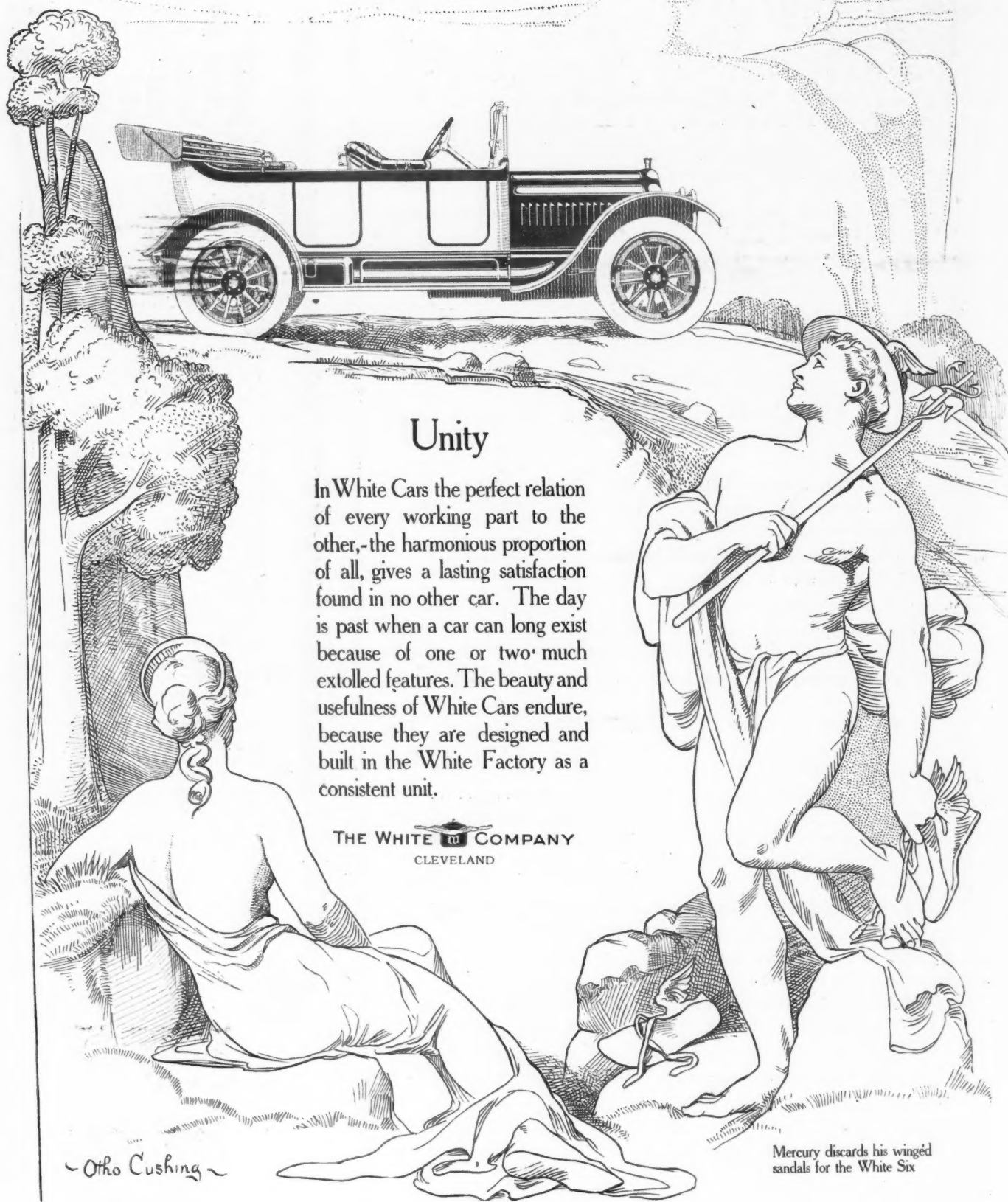
Bosch Plugs must be good to sell that way, and now—what are you doing about the plugs you need?

Go to your dealer today—just look at a Bosch Plug—one glance will be enough, for you couldn't get better value or service anywhere.

Be Satisfied Specify Bosch
\$1.00 each from your dealer,
Bosch Service Stations or direct
[Write for "Locating the Spark Plug"
Sent free on request]

Bosch Magneto Company
214 W. 46th St., New York, N. Y.
156 Service Stations in the
U. S. and Canada





Unity

In White Cars the perfect relation of every working part to the other,-the harmonious proportion of all, gives a lasting satisfaction found in no other car. The day is past when a car can long exist because of one or two much extolled features. The beauty and usefulness of White Cars endure, because they are designed and built in the White Factory as a consistent unit.

THE WHITE  COMPANY
CLEVELAND

~Otto Cushing~

Mercury discards his winged sandals for the White Six

MOTOR AGE

Holding Fashion's Mirror to the Motorist



SPRING is here! You calloused skeptics, who cursed yesterday's snow flurries and this morning madly searched the cedar chests for discarded flannels, challenge this optimistic assertion at your peril! Spring is here! I know whereof I write. The harbingers of the vernal season already are abroad. Over a week ago, a brazen robin chirped from a leafless branch near my window when Big Ben played me false; the children of Hester street have accepted 11-year-old Rachel Cohen as their Queen of the May; fresh crosses have been nailed on small-town gate posts by the dilapidated disciples of perambulation; and the motorist, emulating sweet Psyche at the pool, is about to peer into Fashion's glass.

Tendency of the Times

It probably will be an expensive peer. You will discover that the coat and hat that did such splendid service last year not only exudes an odor of moth balls, but also is spotted, travel-worn and slightly passe. You may conquer your vanity and heroically decide that they will serve for another 2 months at least. Then, just to satisfy your curiosity, you glance at the alluring displays in the shop windows. Farewell, resolutions of motor dress econ-

The Modern Psyche at the Pool

By J. C. Burton

omy! The 1913 garments are impossible! The straight-backed coat of last season is replaced by a sweeping balma-caan, the old gabardine cap is discarded for a swagger crusher of silk or tweed. You have humbled yourself completely, willingly, before the world-old tyrant, Style.

In the patois of the grafter, the picking is rich. According to the shop keepers, the demand for motoring coats, hats and gloves never has been as great as it is this spring, not necessarily because

there are more motorists than ever before but because the great majority of the motorists desire to look the part. A decade ago there was little demand for motoring apparel. Any old suit or outer coat that would not suffer from explorations under and about the machine answered the average motorist's needs.

Distinctive Togs

Deploring such a condition, the maker and designer started to create a demand for distinctive clothing. They worked sanely and wisely, aiming to combine service, comfort and style in the coats they produced. Their efforts were appreciated.

The renaissance in motoring apparel dates



Two innovations for the 1914 season. The illustration on the left shows the Lancaster cape and waistcoat. The cape is of blue serge, with full sweep and apple green golfing facing. The waistcoat is of apple green golfing and is sleeveless. It has large patch pockets and belt and is lined with green silk. The cape fastens to the waistcoat at the back with buttons and loops. Cape and waistcoat sell for \$25 and are from Mandel Bros., Chicago. The hat shown is known as the bon ton motor bonnet. It is made of imported hemp braid and trimmed with a hand-embroidered moire band. It is draped with a three-quarter length chiffon veil, which can be worn over the face or thrown back. The bonnet is marked \$10.

The other coat is a cape coat of blue and tan plaid serge. It has a directoire collar of tan moire silk, large cape sleeve and a drop yoke in front. It fastens with novelty buttons and loops and is lined with tan silk. The coat is from Mandel Bros. and sells for \$37.50. A hat that harmonizes well with this coat is the Mother Goose motoring bonnet of imported blue hemp braid. It is finished with an accordion pleated satin brim, novelty ribbon band and rosettes and is entirely covered with a light blue chiffon veil. It sells for \$15.

from last spring. Nineteen hundred and thirteen was a year of sartorial revolution, especially in men's coats. Materials were selected that would and did give service; materials that combined warmth with light weight and did not show the stains of travel; English tweeds, Scotch and Irish homespuns and imported expanding cloth that defied March winds, April showers and June dust. Comfort and style were obtained in the designing. The ugly duster of the previous season underwent a much-needed metamorphosis. This coat of crash and linen, as well as the coats of tweeds and homespuns, was cut with commodious arm holes, full kimona sleeves and an expansive skirt.

English Wheel Coat Modified

The English wheel coat, with a sweeping swirt that measured 6 yards around the bottom and a trifle too freakish for

the average American motorist, served as a model for the Yankee designer in producing a more conservative but just as serviceable garment. In fact, the English wheel coat is the parent of the balmacaan, a model that first was shown last spring and which in a year has come into almost universal favor because it is both serviceable and stylish. For both men and women, the balmacaan is the most popular motoring coat on the 1914 market. It is deserving of much popularity. The loose arm hole and full sleeve permit of freedom of arm movement in driving and making engine adjustments or other repairs; the



Balmacaan motoring coat of gabardine with yoke lining of satin. It is rather short, has slash patch pockets and fastens with agate ball buttons. This coat sells for \$25 and is from The Hub, Chicago. The hat is a balmacaan model and made of waterproof ecru silk.





Black and white striped coat of novelty cloth with green broadcloth collar and cuffs. It has a kimono sleeve and bias panel in the back and fastens with green novelty buttons. It is lined with green silk and sells for \$45. The coat is from Mandel Bros., Chicago



wide sweep of the skirt affords comfort to the wearer not only while seated in the car when it is a protection for the lower limbs but also on entering or leaving the machine as it allows an unhampered step.

Making Coats Rainproof

Excepting the always reliable coat of gabardine, the alleged rainproof coats of 1913 were rather disappointing. They proved serviceable in showers but played their wearers false in downpours. The makers have profited by the experience of drenched motorists and for this spring have produced a rubberized tweed coat that will stand the H₂O test. It is a balmacaan model with a lining of thin rubber. In addition to these garments, a driving coat of gray rubberized material is a 1914 innovation. It is cut on the lines of the balmacaan but has a double

front and fastens on the right shoulder.

The smart coat for the gentleman motorist is a garment of English covert cloth. It is double-breasted and has slash side pockets, a patch breast pocket, raglan shoulders and a straight back although the skirt has sufficient sweep to insure an unimpeded step. Covert cloth coats, in fact, are very popular with those motorists who do not favor the balmacaan, which are made from homespun and loose-woven tweeds.

For summer touring and driving the

dusters retain their popularity. The majority of these light-weight coats are cut on balmacaan lines. They come in natural and Irish linen, black and white crash mixtures and silk. One of the most popular dusters is made of black and white pin stripe silk mohair. It has a set-in sleeve, slash side and pleated breast pockets, belted back and convertible collar.

Few Driving Suits

There is little demand for gentleman's driving suits and consequently the exclusive shops carry a very small line. One



Rubberized covert cloth balmacaan motoring coat. It has a Prussian collar, full sleeves with cuffs and slash side pockets. It fastens with bone ball buttons. This coat is from The Hub, Chicago, and sells for \$20. The cap is of rubberized tan silk and goes well with the balmacaan coat

Driving coat of gray rubberized material. It has a double front and fastens on the right shoulder. The shoulders are raglan and the side pockets slash. The coat is shown by The Hub, Chicago, and sells for \$20. The hat is a balmacaan model of black and white tweed mixture



Double-breasted motoring coat of English covert cloth. It has a straight back, convertible collar, raglan shoulders and slash sides and patch breast pockets. It is shown by The Hub, Chicago, and sells for \$25

Chicago store features a touring suit of English gabardine. The coat is a Norfolk with two pleats, front and back; straps over the shoulders and full belt. It is quarter lined with silk. The trousers are full length with a 2-inch turnup. There is little call for knickerbockers.

Merchant Tailors' Offerings

The motorist desiring a driving suit of individual design should go to a merchant tailor. Both in Chicago and New York, there are several exclusive tailors who make a specialty of designing such suits. Their customers generally are motorists planning an extensive tour abroad. For such a suit the makers recommend imported sunray-proof cloth which sheds both rain and heat. The material is double-faced and comes in various shades of brown, gray and green with inside fac-

ing of blue, green or burnt orange. The coat is cut sack style in front and Norfolk in back and has an extension sleeve, pleats running to a stitched half-belt in back, yoke extending high over the shoulders and inverted pleat pockets. The seven-button waistcoat is cut exceptionally high and has patched pockets. The majority of customers prefer knickerbockers. These are cut half-pear shape with four-button cuff and belt, running through tunnel loops, of the same material. If plain trousers are desired, they are made ankle length, 1 inch above the shoe, and have a 2-inch turnup.

Custom-Made Motor Coats

These same tailors report a slight demand for custom-made motor coats by the ultra-fashionable driver. For these weatherproof whipcord is recommended. They

Sport coats continue to be popular with the woman motorist. The one on the left is an imported country club model of checked worsted, black and white predominating with stripes of red, blue, orange and green subdued. It has a set-in sleeve with small change pocket in cuff, two box pleats in the back and a belt running all the way around. The patch pockets, two-button collar and cuffs are finished with black silk buttonhole stitching. The coat, which is lined with white satin, is from Mandel Bros., Chicago, and is marked \$35

The coat on the right is a green chinchilla sport coat with a drop shoulder sleeve and large patch pocket. It fastens with large ball buttons of self material and has a tab fastening collar. The garment, which also comes from Mandel Bros. and sells for \$19.75, is unlined



are cut with a bell bottom and loose sleeves, differing but slightly from the balmacaans shown by the dealers in ready-to-wear clothing.

"Coats and hats or caps must harmonize" is the 1914 dictate of Fashion. Hats and caps are made of tweed mixtures, gabardine, silk, crash and linen to correspond with coats of the same materials. Hats, known as tourist crushers, with stitched brim and soft crown and many of them waterproof, are more popular with the average motorist than the caps, which



English touring suit of gabardine. The coat is Norfolk with straps over the shoulders. It is quarter-lined. This suit is shown by The Hub, Chicago, and sells for \$25

Front and back view of a very smart motoring coat of white and green checked chinchilla. The features of this coat are large set-in sleeves, back gathered in with wide stitched belt, large hug collar, deep cuffs and patch pockets. The coat, which is unlined, fastens with ball buttons of self material. It is shown by Mandel Bros., Chicago, and sells for \$29.50. The hat is styled the brimmed motor bonnet. It is trimmed with a grow-grain band and bow and three-quarter length chiffon veil and is marked \$10



are full English shape with pleated back and long vizor. The soft silk crushers, in stripes and checks, are especially suitable for summer touring. The old reliable gabardine cap, with outside flap for the protection of the back of the neck, still is in great demand, not because it is becoming but because it is exceptionally serviceable.



No longer do the gloved hands of the motorist resemble those of the rapier-wielding D'Artagnan. Short gloves of colt and doeskin, with strap across the wrist, have challenged successfully the gauntlet gloves for popular favor, probably because the latter is accepted as part of the professional chauffeur's make-up. For summer driving, the short glove with silk back, leather palm and ventilated fingers is recommended.

Few Changes in Men's Styles

In epitome, men's styles have changed but slightly—in elimination of a belt here



Black and white pin stripe duster of silk mohair. It has a set-in sleeve with wind-shield, convertible collar, belted back and slash side and pleated breast pockets. It is from The Hub, Chicago, and sells for \$15. The hat of rubberized silk matches the coat

Motoring coat of imported novelty brown mixture cut on the lines of the balmacaan. It is single-breasted and fastens with five large bone buttons. It has a raglan sleeve with deep cuff and inner sleeve, roll collar and slit patched pockets and is lined to the waist. It is from Mandel Bros., Chicago, and sells for \$45. The hat is a mushroom bonnet of brown yetta braid, is silk faced, trimmed with cord and rosette of silk novelty ribbon and draped with 1½ yard of chiffon veiling. It is marked \$7.50



and the addition of a pocket there. The spring of 1914 will be known as a season of general acceptance of models that were considered too extreme 12 months ago. The majority of motorists merely have adopted coats and hats that the ridicule-proof minority wore last year.

Women's styles must change annually. That is almost a law of nature. Designers of motoring apparel for the feminine

driver and tourist, however, in producing sartorial innovations, have not sacrificed service or comfort in their desire to create something different than that worn in 1913. We who must pay the bills at least should give them credit for that.

When dress styles changed, it became imperative to change the cut of motor coats. The Bouffant draperies, the puffs, the flounces and pannier effects made necessary an outer garment with a greater sweep to the skirt than the coats of 1913 had. The adoption of the balmacaan or abbreviated wheel coat for women was a natural result.

The futurist craze also influenced the designer of women's motoring coats, and the vivid coloring that is the vogue this season—the blending of orange with green and the crazy quilt Tartan plaids, is due indirectly to the impressionists and their popularity. This is to be a season of color, and unique combinations of color. The more weird the hues, the smarter the coat. Tango, or burnt orange, is the newest shade, but reds and greens were not overlooked by the dictators of fashion.

Two New Materials

In addition to warm chinchilla, rough tweeds and rich novelty mixtures, popular last season and retained this year, two new materials are shown—gabardine, which resembles serge, and golfine, which is similar to corduroy but softer and more flexible.

The novelties in women's motor coats for 1914 are three—the Lancaster cape, the cape coat and the balmacaan. The Lancaster cape, the most distinctive and newest, is a garment with a history. You probably will find reference to it in Macaulay's History of England or Burke's Peerage, although I heard the story of its origin from an importer. The Duke of Lancaster—not the present duke but one of his ancestors three or four centuries back—was responsible for it. He wore the cape on a hunting trip with the king. The monarch thought well of it, ordered the royal tailor to make one for him, and immediately it sprang into popular favor.

The Lancaster cape, adopted for the American market, is a combination cape and waistcoat. The cape fastens to the neck of the waistcoat at the back with a button and loop. The wearer, when motoring, uses both garments but upon arriving at the country club, unfastens the cape and throwing her golf bag over her shoulder, is ready to play eighteen holes, more or less. It is a serviceable garment, the Lancaster cape, and consequently popular.

The cape coat may have a history, but I am ignorant of it. It has a directoire collar, large cape sleeve and a yoke in front. It is an especially good coat for the woman who drives, as it permits freedom of arm movement.

The woman's balmacaan is a replica of the man's balmacaan. It is distinctly a mannish coat and therefore very good

style for motoring. The arm holes are large, the sleeves full and the skirt expansive and thus is a guarantee of comfort to the wearer.

The sport coats which sprang into favor last spring, are as much in demand as ever. They come in chinchilla, worsted, basket weaves and novelty mixtures. Their color combinations are startling, especially those of Tartan plaid, which are almost blinding in brilliancy.

Milliners, who tabooed the veil last season, have suffered a change of heart and the motoring bonnets are again draped with chiffon. There has been little change in hats for the woman who motors. Hemp braid continues to be the popular material for such bonnets and the close-fitting models are in constant demand. The veils on many of the hats are short and so draped that they may be worn over the face or thrown back at the discretion of the wearer. The newest thing in headgear is a French sailor with felt top and hemp facing. It is trimmed with a narrow band of hemp braid and a camellia.

There are three kinds of motoring gloves for women shown. One is a buckskin glove of six-button length with a strap at the wrist, another is the driving gauntlet with soft cuff and elastic wrist and a third with lisle thread back and gauntlet, leather palm and ventilated fingers.

RECENT MARYLAND LEGISLATION

Baltimore, Md., April 13—With the state legislature of 1914 adjourned, the motorists of Maryland now can breathe freely for another 2 years for the lawmakers, although they gave nothing of material value to the motorists, took nothing away from them.

ing away from them.

There were thirty-two bills in all at this session of the legislature which touched on motoring and motorists directly or indirectly. From January 21 to the closing hour of the session, the Automobile Club of Maryland had a representative at Annapolis to guard the interests of its members.

Bills were passed providing for the speedy completion of the Annapolis-Baltimore boulevard; for a loan of \$6,600,000 to be used by the state roads commission in connecting up links in the state roads system; requiring street car companies to pave between their tracks and 2 feet on either side of same in Baltimore; for the employment of motorcycle policemen to stop excessive speeding; limiting the maximum speed on the state roads to 25 miles an hour; for the erection of sign posts on important thoroughfares and prohibiting the use of state roads in the course of construction.

The following laws, branded as objectionable by the Automobile Club of Maryland, were defeated: Bills to increase registration fees, which provided for a tax of \$50 per year on cars of 10 horsepower with a gradual increase up to \$200 annually for cars of over 40 horsepower; bill to permit registration of 16-year-old drivers; bill to prohibit the displaying of banners, flags or streamers on motor vehicles; and bill to increase the registration fees for commercial vehicles from the present charge of \$3 to a maximum charge of \$65.

Bills supported by the motorists but which were defeated provided for same traffic regulations and the carrying of lights on all vehicles at night.

Prest-O-Lite Wins Over Searchlight

Chicago Decision on Refilling Tanks

CHICAGO, April 15—A Prest-O-Lite victory was recorded here yesterday when the United States court of appeals for the seventh district decided in favor of the Indianapolis concern in its suit against the Searchlight Gas Co., of Chicago, upholding Prest-O-Lite and enjoining Searchlight from refilling Prest-O-Lite tanks. This is taken as a final decision in the matter, although a motion for a rehearing could be made.

As interpreted, this means that the Searchlight company has the right to refill tanks "only on condition that the alteration of the tanks be complete and permanent," as the court said. According to the court to remove the Prest-O-Lite trademark and other wording on the newer tanks makes them unsafe but since the tanks are not all marked this way the ones first made by Prest-O-Lite, which only had the trademark etched, can be so altered permanently that this will not conflict with Judge Baker's ruling, it is said.

This decision was handed down by the United States circuit court of appeals after 2 years of litigation, Judges Baker, Seaman and Kohlsaat sitting. It was Judge Baker who delivered the decision and the gist of it is found in the following paragraphs:

"Appellant is enjoined from recharging Prest-O-Lite tanks without completely removing and permanently obliterating from the said tanks the said trademark, Prest-O-Lite. Appellee stamps the mark into the metal so that appellant finds great difficulty in obliterating the mark completely and permanently without danger of making the tank unusable.

"The limit was reached in permitting appellant under any circumstances to make over Prest-O-Lite tanks into Searchlight tanks and permission can stand only on condition that the alteration be complete and permanent."

This suit was begun in 1912 and a preliminary injunction was granted the Prest-O-Lite company in June, 1913.

New Insurance Rates Affect Many Motor Car Dealers

Underwriters Adopt 1914 Schedule of Risks

NEW YORK, April 14—Dealers' cars no longer may be insured for fire and theft at pleasure car rates in the states of the west, southwest, according to new schedules which have been adopted by the Automobile Underwriters' Conference and which become effective April 20; this is true even where short rate cancellation is provided and the limits of insurance named in the schedule are made mandatory.

The states which are included in the two departments and which are affected by the revised rates are:

Western Department—Ohio, Iowa, Wisconsin, Minnesota, Nebraska, Colorado, Kansas, Michigan, North Dakota, South Dakota, Indiana, New Mexico, Illinois, Wyoming.

Southeastern Department—Virginia, Alabama, Oklahoma, Arkansas, Mississippi, Georgia, Florida, Louisiana, North Carolina.

The complete revised schedules for the two departments follow:

On gasoline power private pleasure motor cars and commercial vehicles, such as trucks, delivery wagons, based on manufacturers' original list prices:

	Class		
	A	B	C
Limits of amount of insurance include equipment but not additional bodies. See additional equipment and additional bodies rules below	\$3,500 and over	\$1,500 to \$3,499	\$700 to \$1,499
This and Next Year Models—Insure for not to exceed actual cost or less than 50% of original list price.	1.50%	1.75%	2.00%
Last Year Models—Class A, amounts of insurance at option of company; class B, not more than 70% of original list price; class C, not more than 60% of original list price	1.50%	2.00%	3.00%
Year Before Last Models—Class A, amounts of insurance at option of company; class B, not more than 50% of original list price; class C, not more than 40% of original list price	2.25%	3.50%	4.00%
Minimum premium.			\$15
Three-Year-Old and Older Models—Class A, amount of insurance at option of company; class B, not more than 30% of original list price; class C, not more than 20% of original list price	2.75%	4.50%	5.00%
Minimum premium.		\$15	\$10

Note—Exceptional cases may arise where car is well owned and is in very good physical condition where limits on "3-year-old and older" models are not sufficient. In such case refer to company, with full particulars, when slightly increased amounts may be allowed, but in no case to exceed 40 per cent of original list price.

Reduction—A reduction of 50c from above rates will be allowed for attachment of "non-valued ex-theft and automatic reinstatement" endorsement by use of clause furnished you for that purpose.

CARS LISTING LESS THAN \$700		
	Rate	Minimum premium
Fire and theft.	3.25%	\$12.50

This and next year—		
Fire only	1.50%	7.50
Fire and theft	3.25%	12.50
Last year and older—		
Fire only	3.00%	10.00
ELECTRIC MOTOR CARS		
Rate for full form of fire and theft floater (all models)	1 1/4 %	
Rate for restricted form	1 %	
DEALERS' MOTOR CARS		
New gasoline cars—	Fire and theft	Restricted floater
List price \$3,500 or over	2.25%	2.00%
List price \$1,500 to \$3,499	2.50%	2.25%
List price less than \$1,500	2.75%	2.50%
Electric cars	2.00%	1.75%
Steam cars	3.00%	2.75%

No risk accepted where boiler and burner are located in rear of dashboard. Second-hand cars, 1 per cent additional rate must be charged. Pro rata cancellation allowed with a minimum charge of \$1.

Southeastern Department

Rates for the full form of policy, gasoline pleasure and commercial type cars:

	Class		
	A	B	C
Original list price of motor cars when new, excluding cost of additional equipment and extra bodies	\$3,500 and over	\$1,500 to \$3,499	\$1,499 and less
This and Next Year Models—Insure for not more than actual cost	2 1/2 %	2 1/2 %	2 1/2 %
Last Year Models—Insure class A for not more than 80%, class B for not more than 60% and class C for not more than 50% of list price	2 1/2 %	3 %	3 %
Year Before Last Models—Insure class A for not more than 70%, class B for not more than 50% and class C for not more than 40% of list price	3 %	3 1/4 %	3 1/2 %
Three-Year-Old Models—Insure class A for not more than 60%, class B for not more than 30% and class C for not more than 20% of list price	3 1/4 %	4 %	5 %

Second-Hand Car Rates

Note—Second-hand cars, charge 1/2 per cent in addition to above rates.

Electric Cars—Models of all years, 2 per cent; second-hand cars, charge 1/2 per cent in addition to above rate. Maximum insurance amounts at the option of underwriter.

Taxicabs, Livery and Renting Motor Cars—All risks of this kind must be submitted to the home office. If approved, will be written at not less than 1 per cent, in addition to schedule rates, subject to the following indorsement:

"In consideration of \$.... additional premium permission is hereby granted for the automobile herein insured to be used for carrying passengers for a compensation, provided it is under the personal supervision and guidance of the assured or a chauffeur in his employ while being so used."

RATES FOR THE RESTRICTED FORM OF POLICY

(The theft and reinstatement features excluded from the full policy by attaching the indorsement provided for that purpose.)

Electric Cars, Taxicabs, Livery and Renting Cars, Gasoline Pleasure and Commercial Cars—A reduction of 1/2 per cent allowed from the rates for the full form of policy.

MINIMUM PREMIUM

For the full form of policy.....\$12.50
For the restricted form of policy..... 10.00

DEALERS' MOTOR CARS

Rates for full form of policy:

New gasoline cars—	
Listing for \$3,500 and over	2 3/4 %
Listing for \$1,500 to \$3,499	3 %
Listing for \$1,499 and less	3 1/4 %
New electric cars, all models	2 %
New steam cars, all models	3 1/2 %
(Subject to 1 1/4 % reduction if boiler and	

burner are located in front of dashboard.)

For second-hand and rented cars, charge 1 per cent in addition to above rates. Pro rata cancellations allowed with a minimum charge of \$1 except on cars listing for \$1,499 and less the minimum charge is 50c. Amounts of insurance at option of underwriter.

Rates for the Restricted Form of Policy—A reduction of 1/4 per cent is allowed from the above dealers' rate for the elimination from the full policy of the theft and reinstatement features. Minimum premiums same as above.

Fire Extinguishing Devices—A reduction of 15 per cent of the premium is allowed if a device approved by the underwriters' laboratories of the National Board of Fire Underwriters is carried on the car and an indorsement provided for that purpose is attached to the policy. This reduction, however, is not allowed on additional premiums for the theft full coverage, collision sustained and property damage.

KLAXON WINS ANOTHER SUIT

New York, April 14—A final injunction was granted yesterday to the Lovell-McConnell Mfg. Co. in its suit against the National Auto Supply Co. in the United States district court, southern district of New York. The plaintiff brought suit charging infringement of its patents No. 923,048, 923,049 and 923,122, all issued May 25, 1909, to Miller Reese Hutchinson. Patent No. 923,048 covers a mechanically actuated diaphragm horn and the claims at issue were 16, 17, 19, 24, 27, 29, 36 and 37. The court ruled that the defendant had infringed these.

Patent No. 923,049 covers a cam-operated horn, the claims at issue being 1, 2, 3, 8, 12, 13, 22 and 30, the court ruling that the defendant had infringed these claims.

A mechanically-actuated diaphragm horn is covered by patent No. 923,122, the claims at issue being 1, 2, 3, 4, 5, 6, 7, 8, 9, 13, 14, 15, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 35, 36, 37, 38, 45, 47, 48, 52 and 53. These claims also were infringed by the defendant.

FIGHT FOR FREIGHT RIGHTS

New York, April 10—Hearing before the interstate commerce commission on the alleged discrimination of railroad and steamship companies in loading and unloading at the freight terminals on the river front, came to a close here today and if the decision of the commission is agreeable it can force the railways to so improve the terminal facilities that legal delivery is given all consignees without discrimination.

The case is one of a series being brought up by the National Team Owners' Association through the various local associations, in which it claims the railway companies do not perform their full duty as common carriers of freight or the full services for which they receive compensation. The law requires the carrier to deliver the goods in a reasonable time regardless of the size of the consignment and makes other stipulations regarding the mode of placing the consignment on the floor.



MOTOR AGE
Published Weekly by
THE CLASS JOURNAL COMPANY
910 SOUTH MICHIGAN AVENUE CHICAGO

NEW YORK OFFICE
239 West 39th Street

SUBSCRIPTION RATE
United States and Mexico
\$3.00 per Year
Other Countries including
Canada \$5.00

Entered as Second-Class Matter September 12, 1899, at the Postoffice at Chicago, Illinois, under Act of March 3, 1879

Uniformity of Road Laws Needed

MOTOR car legislation in general and road laws in particular throughout the various states are in a very haphazard condition. Lack of uniformity still is the crying objection to the laws now enforced, although the tendency during the past year or so has been towards unifying the provisions. Many of the laws show evidence of hasty action, have been poorly thought out and in some cases it is quite evident that the legislators who had the work in charge were not sufficiently conversant with the situation to frame up a satisfactory bill.

SOME exceptions to the rule are the measures enforced in a few states, such as Colorado and Illinois, in which measures are taken for consistent and expert supervision of road building and road maintenance. In some states there are road laws enforced which have been on the statute books for over 100 years. The lack of uniformity is probably the clearest indication that the laws have not been constructed on a logical, rational plan.

IT is to be hoped that the movement inaugurated by the American Highway Association in connection with the American Bar Association towards a logical and modern revision of the existing road laws will bear fruit. Above everything else it will make for uniformity among the laws of the various states, for the traffic now is controlled by economic conditions rather than by state lines, and should not be hampered by conflicting codes.

BASIC features of the proposed revision of the laws are founded on the ideas that will make for the best administration of road funds in the construction of highways and the most economic maintenance. There is little doubt that the movement will meet with opposition in many quarters, from the same sources that opposed similar enactments in the two or three progressive states in which similar conditions have been enforced. For instance, the payment of road taxes in cash is bound to meet the disapproval of farmers who have been accustomed to working out their road taxes at any time and, to some extent, anywhere they see fit. The elimination of a multitude of necessary road officials now characteristic of many of the states will not be accomplished without a strong fight from those politicians who hold the highways to be among the fattest pickings of the political spoils system. From this source also there will be opposition to the requirement of skilled supervision in the construction and making of roads by providing qualification tests and by the appointive rather than the elective method for such a system. It is improbable that the opposition of organized labor to the employment of convicts upon the roads need be feared to the extent that it formerly was. It was Illinois' experience, in which the efforts of opponents that the Tice bill, now become a law, to arouse organized labor against the convict labor provision proved futile. Nevertheless, the goal of these associations is one worthy of strenuous effort.

The Human Storage Battery

IT is as important for the pleasure you get out of motoring to make certain that your starting and lighting battery is in good condition as to be sure your tires have been looked over and that they really are ready for the summer touring. A storage battery is one part of a car that goes backwards when idle. The battery gradually discharges during the time the car has been garaged and unless given a good charging and perhaps some additional recharging it will not be in first class condition to start the season with.

TWO weeks ago we recommended having your tires gone over before taking the car out, having the rims taken off the wheels, and the tires off the rims and the tubes out of the casing. With the storage battery it is not necessary to go so far, but it is essential to have the battery well recharged and if necessary overhauled. Whether the battery requires overcharging or repairing can be told only by the battery expert into whose hands you place it. He may find that after a normal recharge the voltage drops, which may indicate a broken jar or some other defect. He may find the plates badly sulphated. Worse still, he may find the active material falling away. There are other troubles such as the need of new separators.

IT is questionable if in any other department of the car it is more essential to use the stitch-in-time doctrine than with the battery. A little attention may cost you not more than \$2 or \$3 but if you let the trouble go too long your repair bill may be \$25 or \$30. It will not take more than 3 or 4 days to insure yourself that your battery is in proper condition and it is worth while to get it in this condition before the start of the season.

HAVING your battery in proper shape at the opening of the season does not mean that you must not give it some attention during the remainder of the year. You must give the battery attention just like you give the motor oil or pour gasoline into the fuel tank. The chemical action that goes on in the battery cells during charging and discharging generates heat and this heat evaporates much of the water that is in the electrolyte in the cells. Once every 10 days test the cells to note the height of the electrolyte on the plates and also to note its specific gravity with the hydrometer that you have for the purpose. Do not neglect this. With the electrolyte in good condition at the opening of the season there will be little need for adding more acid during the year, but you will have to add distilled water to keep the electrolyte as high on the plates as it should be. Distilled water can be purchased from any drug store and if not convenient many of the special table waters sold in bottles will serve. Pure rain water, collected after the rain has been falling for some time, is also good. The water collected from the early minutes of the shower may contain many impurities collected from the roof of the building or from the atmosphere and should not be used.

TO avoid battery trouble during the touring season there is but one certain course and that is to get the battery habit. Get into the habit of testing your battery the same as you do in testing the amount of oil in the crankcase. Be as careful with the battery as you are in seeing that the gasoline tank is filled or that your tires are inflated to the proper pressure. When you get the habit the work is a light task, but until you accomplish this it will be more or less of a white elephant on your hands. Getting the battery habit is the same as getting the tire-inflation habit.

Revising of American Road Laws Is Contemplated

National Movement to Amend Highway Codes

WASHINGTON, D. C., April 10—Road laws which have been on the statute books of various states for more than 100 years probably will be repealed as a result of the movement which has been inaugurated by the American Highway Association in conjunction with the American Bar Association. The committees appointed by the two associations have had prepared through the cooperation of the United States office of public roads a complete literal compilation of the road laws of all the states, as well as the laws relating to indebtedness, the use of convict labor, and various other subjects which have a bearing upon the management of the public roads. An index chart for these various laws is now being prepared and as soon as it is completed the committees will determine upon the lines along which revision will be sought. The governors of the various states then will be asked to recommend to the legislators as they meet, the appointment of special committees to confer with the committees of the American Highway Association and the American Bar Association, with a view to adequate revision of existing road laws and bring them up to date.

Would Repeal Obsolete Laws

The first step in the revision of the state road laws will be to recommend that all obsolete, useless, or unnecessary road laws be repealed. The next step will be to simplify and arrange in logical order the existing necessary road laws. The committee has found that in some of the states an accumulation of road laws running back over 100 years exists, thus creating almost hopeless confusion. Certain basic features of good administration will be urged by the joint committees, such as the payment of road taxes in cash; the elimination of a multitude of unnecessary road officials now characteristic of many of the states; the requirement of skilled supervision in the actual construction and maintenance of roads by providing qualification tests; the constant employment of highway engineers or superintendents; the adoption of the appointive rather than the elective method for such officials; the substitution of continuous maintenance for the present intermittent method; the proper utilization of convict labor where climatic and other conditions warrant its use on the public roads for the preparation of road materials; the general adoption of the principle of state aid and supervision; the proper safeguarding and accounting of road funds.

Uniformity Desired

Wherever practicable, uniformity among the road laws of the various states will be urged by the committees as it is realized that the traffic is now controlled by economic conditions rather than by state

lines and should not be hampered by conflicting laws of the various communities in the United States.

It is expected that a most interesting report will be made by the joint committees at the fourth American road congress which will be held at Atlanta, Ga., November 9-14, 1914.

COLORADO TO DRAG ROADS

Denver, Colo., April 10—The written pledges of 100 farmers to construct split-log road drags and use them systematically upon their own roads are among the immediate results of a week's good roads campaign just closed in Denver and four adjoining counties by the Denver Motor Club. By following out carefully the system of road dragging explained and practically demonstrated at these good roads rallies by D. Ward King, of Missouri, it is claimed that an expenditure of \$10,000 this year will put the roads of this section of Colorado in better shape than could be done at a cost of many times that amount by the ordinary grading, etc.

PROFESSOR TALKS ROADS

Philadelphia, Pa., April 11—"The Improvement and Reconstruction of Suburban and Country Roads to Withstand Wear from Motor-driven Vehicles" was the subject of a lecture given by William Easby, Jr., professor of municipal engineering at the University of Pennsylvania, in Houston hall this afternoon.

Professor Easby dwelt on the rapidly increasing motor traffic in roads not built originally to stand it and the necessity of scientifically reconstructing roadways to withstand the combination of horse and motor travel. He said in part:

* * *

Obituary

J. ELLWOOD LEE, manufacturer, inventor and president of the Lee Tire and Rubber Co., of Conshohocken, Pa., died suddenly April 8 at his home in that town. Death was attributed to heart failure. Mr. Lee was about 55 years of age. He was a self-made man in every sense of the word. Starting his business career with less than \$30, he accumulated a fortune. It was in 1905 that he embarked in the manufacture of motor car tires. The business grew rapidly, and before very long several large buildings were erected at Spring Hill. The factory today employs 800 men. Mr. Lee's interests were many and varied. Besides being the head of the Lee Tire and Rubber Co., he was vice-president of Johnson & Johnson, of Philadelphia and New Brunswick, N. J., surgical instruments and dressings. He is survived by a widow and three children.

"The damage to the ordinary broken stone road from the passing of motor cars is due partially to the interesting fact that a rapidly moving machine creates a vacuum in its wake which removes much of the finer stone and grit from the road surface. This is not forced into the surface again by the next passing vehicle.

"The million and a half motor cars now in use probably will in the near future demand the conversion of water-bound highways, in which nothing but water-wet stone is used, into roads in which the broken stone is more firmly and imperviously held together with bituminous binders, or made into a sort of continuous truss, or series of trusses, with cement."

He said that while the motor car gave the road builder a new problem in maintenance, there was no question but that motor traffic has been the main factor in the present world-wide movement for the extension of the hard surface road system. Mixed motor and horse traffic, the speaker said, was more damaging to bituminous surfaces than an equal amount of motor traffic.

MISSOURI'S ROAD REPORT

St. Louis, Mo., April 12—According to figures obtained from Colonel Henry Buffum, state highway commissioner, this week, Missouri has 117,634 miles of dirt roads of which 63,370 are wholly unimproved. The improved roads average 54,263 miles. These either are dragged or graded. The state has but 3,420 miles of gravel made roads, 1,417 miles of macadam, 50 of patent surface, 570 miles are of the sand clay surface, and 700 miles of chat; 342 miles of the state's roads are covered with miscellaneous coverings.

During the fiscal year of 1913, \$4,755,315 were spent in building and repairing roads and of this amount \$1,913,376 was county court appropriations. The state spent \$112,500 for road dragging; \$387,274 was donated; \$352,739 was appropriated by the road districts, and \$1,692,102 came from the bridge fund of the state.

Colonel Buffum said he would urge Governor Major to call two good roads days again this fall.

TO INVADE YELLOWSTONE

Billings, Mont., April 10.—Two thousand cars will journey to Gardiner, Mont., the gateway to the Yellowstone park, and one terminus of the Yellowstone Park trail, next summer when the trail association meets at Hunter's Hot Springs. The motor cars cannot get into the park, but if the plans of the trail association are carried out, they will make this pilgrimage to protest. It is planned to have the course of machines photographed, with the sign "Let Us In," prominently displayed.

Segregation of Vanderbilt and Grand Prix Urged

Tacoma and Seattle Speedway Meets Billed—Indianapolis Gossip

CHICAGO, April 14—Divorce of the Vanderbilt and grand prix is recommended by Fred J. Wagner, who served as referee of the last grand prix, run at Santa Monica, Cal., and won by Ed Pullen in a Mercer. Referee Wagner has just made his report to the Automobile Club of America, which controls the grand prix, and in his letter he suggests that in future the two events be separated.

"Before concluding, let me point out a complaint that has been frequently registered in my search for entries, not only by private entrants, but by manufacturers," writes Referee Wagner. "The makers contend that these two races as they now are staged are of no commercial benefit to them, basing their objections on the following grounds: That the winner of whichever race is first on the program loses almost the entire benefit from a publicity standpoint, due to the short interval between the two events and consequently does not justify the large cash outlay involved in preparation and participation. The private entrant finds fault because the time is insufficient to prepare for the second event, as he lacks the facilities that the manufacturers have at their command.

"In submitting these facts for your consideration, I believe if you will investigate the conditions indicated above you will find a sentiment favoring a separation of the two events which will largely increase the entry list in future in both the grand prix and Vanderbilt cup races."

Segregation Possible

The logic of Referee Wagner's contentions already has been accepted by California promoters, as is shown by the fact that already there are steps being taken to permit Los Angeles to run one of the classics in 1915 and turn the other over to San Francisco. This is as it should be, and it is believed that hereafter these two big events will not be permitted to overshadow each other.

Originally the two were segregated. The grand prix was first run at Savannah in 1909 by the Automobile Club of America when it was warring with the American Automobile Association. Peace being declared, it was planned in 1910 to run the grand prix over the Long Island parkway course 2 weeks after the Vanderbilt. The latter classic that year was marked by so many fatalities that it was deemed best to cancel the grand prix because it was impossible to get military protection for the Long Island course.

The next year Savannah came to the front and agreed to stage the two classics, with a couple of days intervening between each. This established the precedent that has been followed since. The Georgians also staged the 1911 meet and when Milwaukee grabbed the plum in 1912 the same

By C. G. Sinsabaugh

procedure was followed. Santa Monica followed suit and there was the rule firmly established.

That the manufacturer does not cash in on the first race run when this system is followed has been demonstrated more than once. For instance, after de Palma had won the last Vanderbilt the daily papers the next morning had to curtail their stories of the running of the Vanderbilt in order to give proper space to the preparations for the grand prix on the day following. As for the evening newspapers of that day, they were filled with grand prix stories, while the de Palma victory in the Vanderbilt only received scant mention. The day that grand prix was run apparently everyone had forgotten all about the Vanderbilt.

Segregation of the two races would be best for all concerned. Each would stand out as a great race. There should be at least a month intervening and the races, if possible, should be handled by different promoters. One in Los Angeles and the other in San Francisco seems to be the proper procedure for 1915.

Wagner also makes another excellent suggestion—that in future drivers must keep their hands on the steering wheel unless approaching the pits at reduced speed and with the car under complete control. He wants a rule covering this point. This is brought up by the accident to Marquis in the Sunbeam in the last grand prix. Wagner declares that the Sunbeam overturned because Marquis waved his left hand to the crowd of Death curve. With only one hand on the steering wheel, a tire blew and the car turned over. "This is the third or fourth accident resulting from the failure of drivers to keep their hands on the steering wheel," says Wagner.

Tacoma Announces Meet

Sanction has been granted by the American Automobile Association for the Montamara festo races which are to be run on the Tacoma speedway under the auspices of the Tacoma Automobile Club at Tacoma, Wash., July 3 and 4. The Tacoma speedway is a 2-mile track, with an asphalt surface and ranges in width from 30 to 60 feet. The cash prize offering totals \$10,500, and in addition there are the Golden Potlach, the Inter-City trophy and the Montamarathon cup.

The Inter-City Century race is for class E cars, 450 inches and under, and the distance is to be approximately 100 miles. The entry fee is \$50 a car and the race is confined to cars entered from cities in either Washington, Oregon, Idaho, Montana, British Columbia or Alberta. It must have been in service for at least 60 days and

must be handled by a driver who has resided in the state from which the entry is made for at least 3 months preceding the race. In addition to the trophy given by the Tacoma Automobile Club, there is \$750 for first, \$350 for second, \$250 for third and \$150 for fourth.

The Golden Potlach trophy also is class E, with the piston displacement 600 inches or under. The distance is to be 200 miles and the cash prizes run \$1,500 for first, \$850 for second, \$700 for third and \$450 for fourth. The entry fee is \$150.

The Montamarathon is a class D free-for-all at 250 miles, with the entry fee placed at \$200. The winner pulls down \$2500, while \$1500 goes to second, \$950 to third and \$550 to fourth.

Entries close June 29 with the Tacoma Speedway Association, Perkins building, Tacoma, Wash. George D. Dunn is secretary of the association.

Indianapolis Gossip

Indianapolis has failed to produce any more entries within the past week, but this does not mean an abatement of interest in the 500-mile race. There are twenty-one nominations in now, while it is easy to count at least fifteen more that are certain. E. A. Moross is holding back the three Maxwell nominations until he has secured all his drivers. So far Carlson is the only one actually signed, but it is thought that Tetzlaff will sign up very shortly. William Ziegler, Jr., owner of the Sunbeam and Isotta, has not been heard from either, while it is reported that E. V. Richenbacker is getting two or three Masons ready for the big battle.

While Ralph Mulford is booked to drive the Mercedes-Peugeot for E. J. Schroeder, still he has built two Mulford specials which will make their debut in the big race. One of these is to be driven by L. Applegate, while it is said Billy Chandler will have the other one. Guy Ball, second in the Vanderbilt with the Marmon, also is reported to be getting ready, while Guy Thomas of Minneapolis is said to be contemplating the entry of one of the Pope-Hartfords that ran in the 1910 Vanderbilt. Also reports come from abroad that there may be two Clement-Bayards and a Bugatti entered, but these are conditional on their being completed in time, which is doubtful.

More accessory money for Indianapolis is in sight. Following the \$1500 offered by the Rayfield carbureter people and the \$850 hung up by the makers of Red Head spark plugs, the Standard Roller Bearing Co., of Philadelphia, writes it has been empowered by the manufacturers of the Rudge-Whitworth wire wheels to announce that \$500 will be given for first, \$250 for second and \$125 for third if Rudge-Whitworth wire wheels are used.

Wheeler & Schebler of Indianapolis, makers of the Schebler carbureter, are renewing their interest in the racing game, and this week announce \$1,700 in cash prizes for the Indianapolis meet, divided, \$1,000 for first, \$300 for second, \$200 for third and \$100 for fourth, provided Schebler carbureters are fitted.

The American Automobile Association, in its last bulletin, announces that the national tour this year will be the Chicago-Boston day and night non-motor stop run of the Chicago Automobile Club, with the Glidden trophy as the main consideration. Next year, says the A. A. A., the national tour will go to the Panama exposition at San Francisco.

As for the A. A. A. National trophy and the Anderson cup, both contested for last

year in the national run, they will be offered in competition this year in connection with the tour to the mid-summer meeting in the White Mountains under rules to be formulated by Frank X. Mudd, chairman of the A. A. A. national touring board. **Seattle Speedway Announced**

Frank G. Lowry is in Chicago on his way to New York, where he intends securing from the American Automobile Association a sanction for a meet on the new Seattle speedway which is scheduled for July 18-19, and for which a purse of \$15,000 will be offered.

Lowry announces that he has been made vice-president and general manager of the new track, work on which starts tomorrow. J. J. Henry is president, Charles Wisner treasurer, C. E. Johnson secretary

and Howard Hughes legal adviser. The new track is a different project than the one which was announced several months ago. It is to be located at the Meadows, 5 miles from the heart of Seattle's business district. Five railroads run to it and there is a fine motor road also leading to it.

The track is to be only 1¼ miles in length and will be built with a concrete base and an asphaltum surface. The turns will be banked 7 feet and the grandstands for the first meet will be capable of accommodating 25,000 persons. The first day will be given up to sprint races and on the second day there will be run a 200-mile race for a \$10,000 trophy and a purse, the size of which has not been determined as yet.

French Grand Prix Lists Close With Forty-One Entries

Six Nations Represented in European Classic

PARIS, April 4—Lists are closed for the French grand prix race, with forty-one cars inscribed. This is the greatest number obtained for any recent contest in France, and is also the most international. France has twelve cars, Italy eleven, Germany eight, England six, Belgium two, Switzerland two. Nazzaro and Caesar, both Italian firms, put in a car each at double fees. The full list, which cannot undergo any modification, for the make up of the race is definitely settled, is as follows:

FRANCE

Car	Driver
Delage	Albert Guyot
Delage	Bablot
Delage	Arthur Duray
Peugeot	Georges Boillot
Peugeot	Jules Goux
Peugeot	Victor Rigal
Alda	Tabuteau
Alda	Petit
Schneider	Champoiseau
Schneider	Gabriel
Schneider	Croquet

ITALY

Fiat	Cagno
Fiat	Fagnano
Fiat	Scales
Nazzaro	Felice Nazzaro
Nazzaro	Porporato
Nazzaro	Minola
Aquila-Italiana	Berla d'Argentina
Aquila-Italiana	Marsaglia
Aquila-Italiana	Constantini
Caesar	

GERMANY

Mercedes	Louis Wagner
Mercedes	Lautenschlager
Mercedes	Salzer
Mercedes	Pilette
Mercedes	Nagel
Opel	Joerns
Opel	
Opel	

ENGLAND

Sunbeam	Jean Chassagne
Sunbeam	Darius Resta
Sunbeam	K. Lee Guinness
Vauxhall	J. Hancock
Vauxhall	Lestie Munro
Vauxhall	W. Watson

BELGIUM

Nagant	Elskamp
Nagant	Esser

SWITZERLAND

Picard-Pictet	
Picard-Pictet	

Several of the grand prix racing cars already are on the road. The first of the Peugeots went out this week. The Delage

By W. F. Bradley

machines are being assembled after having undergone complete bench tests. The Sunbeam drivers will put their first machine through its road tests in the neighborhood of Lyons during the middle of the month.

In general features Peugeot has adhered to last year's design, maintaining sixteen overhead valves with direct operating overhead camshafts, and the distinctive type of lubrication with the entire oil supply outside the engine. The new motors have two magnetos firing simultaneously. The novelty of the Peugeot cars is the fitting of front wheel brakes.

When Georges Boillot made an examination of the course he came to the conclusion that an unusually high efficiency set of brakes would be necessary in order to win the race. One of the legs of the course is straight, the second is slightly winding, the third is cut on the face of the mountain and has forty-five distinct turns in a distance of less than 10 miles. Trials were made with a powerful Isotta-Fraschini car fitted with front wheel brakes. The result was so satisfactory that the Peugeot racing department decided to make use of brakes on all four wheels.

Front Wheel Brakes Favored

Boillot declares that he can approach turns at a much higher speed than is possible with any other kind of brakes, thus saving several seconds per lap, and that the car is under more complete control than with brakes on the rear wheels only. Even when braking furiously there is no tendency for the car to skid across the road. This is an important feature, for on the most difficult portion of the Lyons course the drivers have a vertical wall on the right and a clear drop on the left. All other firms are paying close attention to brakes, but Peugeot appears to be the only one applying them to the front wheels.

Delage has modified his previous year's design in the matter of valves. In place of sixteen horizontal valves, his monoblock motors have sixteen valves inclined in the head and operated direct by overhead camshafts, each one carried in an aluminum housing and driven by bevel gearing and vertical shaft in front of the motor. A ball-bearing crankshaft is made use of as in previous year's models, and the lubrication remains the same with increased facilities for cooling the oil.

Sunbeam Modifies Valve Design

Sunbeam has also modified the valve design. Instead of a six-cylinder L-type motor used in the previous continental races, Engineer Coatalen has designed a monobloc engine with four cylinders, having sixteen valves inclined in the head and directly attacked by two overhead camshafts, the design abolishing the use of rocker arms. The motors have a bore and stroke of 94 by 160 millimeters, this giving the maximum cylinder area allowed under the rules.

The valve-in-the-head type motor undoubtedly will predominate in this race. It is known already that it has been adopted by Sunbeam, Delage, Peugeot, Nazzaro, Fiat, Nagant, Alda, and Mercedes. The design varies considerably, but the preference is for what is known as the Peugeot type with sixteen inclined valves and separate overhead camshafts practically attacking the valve direct. Under this system the tappets are combined with the cams, the rocker arms, which have always been a source of trouble and have prevented the highest motor speeds being abolished.

Picard-Pictet announces that the motors it will put in the grand prix race will be its single-sleeve valve type. The names of the drivers have not yet been announced. Jean Chassagne and Darius Resta intend trying out the first of the

Sunbeam cars in France this month. They will not be allowed on the grand prix course, this set of roads being closed in order that the preliminary work on the roads may be pushed forward.

It is officially announced that Louis Wagner will drive for Mercedes in the French classic; it is denied that Ralph de Palma will handle one of these cars. Nazzaro, who has put in three cars, has selected as his team mates, Porporato and Minoia. The Nazzaro machines have four cylinders of 94 by 200 millimeters bore and stroke, with four overhead valves per cylinder.

BOSTON TO AID CHICAGO

Boston, Mass., April 13—President William H. Stevens of the Bay State A. A. has called a meeting of the runs and tours committee of the club to take up the matter of co-operating with the A. A. A. and Chicago Automobile Club in the run to Bretton Woods this summer at the completion of the Chicago-Boston endurance run. He intends to have the Bay State represented in the run, and already a number of members are planning to go along either as contestants or non-contestants. Because of the date and the fact that it is the beginning of the summer it will be possible for the hotel to accommodate a big crowd at the mountains. The feasibility of resurrecting the Climb to the Clouds will be discussed by the club officials, and if that is not possible there may be a climb through Crawford notch.

MOTOMETER PEOPLE START SUIT

New York, April 14—Harrison H. Boyce and the Motometer Co., Inc., have brought suit in the United States district court, southern district of New York, charging the Stewart-Warner Speedometer Corp., of New York, with infringement or threatened infringement of letters patent No. 1,090,776 applied for January 3, 1913, and granted March 17, 1914. The plaintiffs aver that the Stewart-Warner Speedometer Corp., of Chicago, and incorporated under the laws of Virginia, and the New York corporation stand in the relation of manufacturer and sales agent, but the Chicago corporation is not made a party to the suit, as it does not come under the jurisdiction of the New York court.

INSURES FAMILY ALSO

New York, April 11—The London and Lancashire Guaranty and Accident Co. is issuing an endorsement on motor car liability policies extending the coverage to the assured's immediate family without additional charge. The endorsement limits the family to the assured's wife and sons and daughters between the ages of 17 and 21 years while residing with their parents. This action was taken by the London and Lancashire in view of the recent court decision holding that an owner was not liable for accidents occasioned by his car while being operated by a member of his family.

Twenty-Four Cars in Isle of Man Race

Hudson May Be Among Starters

LONDON, April 1—Entries for the Tourist trophy road race, which will be held in the Isle of Man on June 10 and 11, have closed with a total of twenty-four. This is only one more than the list showed when it closed at single fees, although four cars have been added at double fees, the difference being made by the withdrawal of the three Belgian Pipes which were among the earliest nominations.

The four additions are a D. F. P., a Sava, a Crossley, and a car entered by A. Rawlinson, the well known polo player. Rawlinson has not yet named the car he will drive, but from the fact that he is chief of the Rawlinson-Hudson Motor Car Co., Ltd., one would ordinarily expect it to be a Hudson from America. However, the Royal Automobile Club declares that he cannot yet definitely say so. The full list is as follows:

England—Three Humbers, three Sunbeams, three Vauxhalls, two Stars, two Straker-Squires and one Crossley.
Belgium—Three Minervas and one Sava.
Germany—Three Adlers.
France—One D. F. P.
Switzerland—One Martini.
Unclassified—One car entered by A. Rawlinson.

HOOSIERS TALK ANNUAL RUN

Indianapolis, Ind., April 12—Officers were elected and plans for the annual run discussed at the annual meeting of the Indiana Automobile Manufacturers' Association held in Indianapolis, April 9. The meeting was held in the rooms of the Hoosier Motor Club in the Claypool hotel.

The new officers are: President, R. P. Henderson of the Henderson Motor Car Co.; vice-president, W. B. Harding, of the G and J Tire Co.; secretary, Joseph M. Ward, of the United States Tire and Rubber Co.; treasurer, Guy O. Simons, of the Motor Car Mfg. Co.; directors, Mr. Henderson, Mr. Simons; George M. Dickson, of the National Motor Vehicle Co., and Howard Marmon, of the Nordyke & Marmon Co.

The association, which gave the four states run in 1912, and the Indiana to the Pacific tour last year, has two routes under consideration for this year's run. One of these is through Iowa, Nebraska and Minnesota. The other is through Kentucky and Tennessee to the southern trail, or west to St. Louis and then south to the trail which would be followed into Texas.

MILWAUKEE REVIVING RUN

Milwaukee, Wis., April 13.—Prospects of the framing of a stock car classification for 1914 by the contest board of the A. A. A. have strengthened hopes of the revival of the annual Wisconsin reliability tour for the Milwaukee Sentinel and Emil Schandeln trophies. The tour, initiated in 1910, was abandoned in 1913 because of the absence of stock car specifications for

a grade 1 contest and the refusal of the A. A. A. contest board to permit the Wisconsin State A. A. officials to provide specifications by their own efforts. Now that Chairman Kennerdell has started to provide the list for 1914, the W. S. A. A. officials are going ahead with their plans for a big run in July, to last 5 days and cover approximately 1,000 miles, which was the basis of previous tours.

RACE TO TEST BRAKES

Paris, April 1—Mountainous Auvergne has been selected as the scene of the next coupe de l'Auto race, for cars of not more than 146 cubic inches cylinder area. This race is the continuation of what is known as the 3-liter series. All possible advantages having been secured from the 3-liter—183 cubic inch—rule, the cars will, for the first time this year, be limited to a cylinder area of 146 cubic inches.

The date of the race has been fixed for August 23. The course is 18 miles around. It comprises the famous Baraque hill, included in the last Gordon Bennett race, and considered exceptionally difficult. This 3-mile length of 10 per cent gradient is the easiest portion of the whole course, however. In the opinion of experts, this course is the most difficult one on which a road race ever has been run. In selecting such a set of roads the men responsible for the race have had in view the improvement of brakes. It is pointed out that in previous races every part of the machine has been thoroughly tested, but brakes have been left as they were.

In the 146-cubic-inch race the cars will have to be fitted with an excellent set of brakes or it will be impossible for them to keep on the course. It is estimated that cars running in the 146-cubic-inch race will be capable of 80 miles an hour on the level, but owing to the mountainous nature of the roads it is not supposed the average will be equal to 45 miles an hour.

URGES TRAIL TO COAST

Livingston, Mont., April 10.—The Montana section of the Yellowstone Trail Association recommends that the trail, already laid out from the Twin Cities to the Yellowstone National park, be extended to the Pacific coast, and that the residents west of the national park be urged to cooperate in pushing the great inter-state road. At the recent state meeting held at Livingston, Mont., the Coast-to-Park motor highway was endorsed.

Officers of the Montana branch of the Yellowstone Trail Association were elected as follows: S. F. Way, Livingston, president; J. A. Werner, Forsyth, vice-president; A. Buchanan, Miles City, vice-president; George Cutting, Livingston, secretary.

Crossing the Continent in Detroit

Saxon in Long Endurance Test

DETROIT, Mich., April 14—A new kind of endurance run is under way in the city of Detroit. A Saxon light car is each day grinding out 135 miles of a total run of 4,050 miles, or a distance equal to the mileage from New York to San Francisco—and all within the city limits. The route traverses several of the city streets and boulevards and covers 12 miles. From the Pontchartrain hotel, the car goes south on Woodward avenue to Jefferson avenue, then east to Grand boulevard, around this thoroughfare to Woodward again, then south to the starting point. It checks in at the hotel on each trip. The run is to last for 30 consecutive days, and eleven circuits per day are to be made. Each round trip consumes 40 minutes.

Tonight the car checked in at the end of its sixth day with 810 miles to its credit. The machine was said to be operating easily and it is expected by the officials of the Saxon company that the run will be productive of some unusual records in economy.

ALPS TEST FOR CYCLECARS

Paris, April 4—European cyclecars will be put to their first severe public test in the 6-day trials to be held in the French Alps around Grenoble from August 3 to 9. The trials are international and are open to motoreycles as well as to cyclecars. The latter are designated as machines having a cylinder area of not more than 1,100 cubic centimeters. Four daily stages will be made through the Alps, distance being from 135 to 155 miles. There will be a 200-mile run from Grenoble to Dijon and a final daily trip of about same distance from Dijon to Paris, where the competition will come to an end.

The routes through the Alps will comprise the most difficult passes in Europe. The Lautaret and the Galiber, nearly 9,000 feet above sea level, will have to be tackled and the whole chain of the Grande Chartreuse mountains will have to be cov-

ered. These passes are only free from snow 3 months in the year and although the roads are well made and well kept, the climbing of the heights is considered the high water mark of efficiency in the European motor world.

It is probable that the speed imposed will be 19 miles an hour with controls every 30 miles and a loss of points for arrival 5 minutes before or 5 minutes after the official time. The entire distance will have to be covered without the changing of any parts, spark plugs and tires not being considered changes. Spare parts can be carried, but if they are used points will be deducted. On finishing at Paris the machine will be subjected to a close technical examination and only awarded a clean score if in excellent condition.

2500-MILE SOCIABILITY PLANNED

Colorado Springs, Colo., April 11—The tentative itinerary for the 2500-mile sociability run from Colorado through Texas, Oklahoma and Kansas has been mapped out and detailed preparations are now being made by Pueblo, Colorado Springs, Manitou, Canon City and Trinidad for this tour.

The cars will leave the Garden of the Gods at the foot of Pike's Peak bright and early the morning of Monday, May 4, and it is planned that 3 weeks shall be consumed in the trip. The first week's run will be over the Panhandle division of the Colorado to the Gulf highway to Fort Worth and Dallas; the second taken up with the triangular run to Waco, Austin, San Antonio, Freeport, Galveston, Houston and return by the Gulf division of the Colorado to the Gulf highway; and the final week of the trip through Oklahoma by way of Oklahoma City and Guthrie to Wichita, Kan., with return westward over the New Santa Fe trail to Pueblo and Colorado Springs.

The line of the route, as tentatively ar-

ranged, will be through the following towns:

COLORADO—Colorado Springs, Fountain, Canon City, Florence, Pueblo, Walsenburg, Trinidad.

NEW MEXICO—Raton, Des Moines, Clayton, Texline.

TEXAS—Dalhart, Channing, Amarillo, Claude, Goodnight, Clarendon, Memphis, Estel-ine, Childress, Quanah, Chillicothe, Vernon, Electra, Wichita Falls, Henrietta, Bellevue, Bowie, Sunset, Alvord, Decatur, Fort Worth, Dallas, Hillsboro, West, Waco, Temple, Georgetown, Austin, San Marcos, New Braunfels, San Antonio, Cuero, Victoria, Freeport, Galveston, Houston, Conroe, Huntsville, Madisonville, Centerville, Teague, Mexia, Corsicana, Waxahachie, Dallas, McKinney, Sherman, Denison.

OKLAHOMA—Durant, Sulphur, Pauls, Valley, Purcell, Norman, Oklahoma City, Guthrie, Perry, Ponca City.

KANSAS—Arkansas City, Wichita, Newton, Hutchinson, Sterling, Ellinwood, Great Bend, Pawnee Rock, Larned, Kingsley, Dodge City, Cimarron, Garden City, Syracuse.

COLORADO—Holly, Granada, Lamar, Las Animas, La Junta, Rocky Ford, Manzanola, Fowler, Pueblo, Trinidad, Canon City, Colorado Springs, Manitou.

MOTOR BRIDGE OPENED

Philadelphia, Pa., April 11—The South Jersey seashore resorts were the Meccas today for an almost endless procession of motor cars. Toward afternoon the congestion at the ferries on the Philadelphia side of the Delaware river became alarming, as the ferry boats were unable to handle the rush and the cars were compelled to form in line and await their turn.

No matter to what resort bound, the motor cars included in their itinerary today the route that would take them to the celebration incident to the formal opening to motor traffic of the intercounty motor bridge between Ocean City and Somers Point, the connecting link in New Jersey's Ocean boulevard.

On the New Jersey side of the river the motorists ran into more trouble and delay. Upon arrival in Camden inspectors of the state motor vehicle department were out in force and several car owners were stopped for violation of the 15-day tourist privilege and forced to take out a Jersey license before being allowed to proceed.

KEROSENE TEST DATE CHANGED

Paris, April 1—Coinciding with the Paris show, it has been decided to change the date of the French kerosene motor competition from October 1 to November 15. Three cash prizes totaling \$12,400 are offered for competition. The event is both a bench and a road test, the motors first being run on a bench for power and consumption tests, then placed in a chassis and made to cover a long distance on the road. Owing to the change of date entries are now received until May 15.

SUNBEAMS AMONG THE RECORDS

London, March 25.—With Chassagne at the wheel the 47.7-horsepower twelve cylinder Sunbeam once more has gotten among the records. At Brooklands this week it was sent against the 60-horsepower class marks, and with a flying start did the ½ mile in :15.03, an average of 119.6 miles per hour; and the 1 mile in :29.82, equal to 120.73 miles per hour and beating the previous best of 106.86 miles per hour.



Saxon car that is engaged in a run of 135 miles a day for 30 consecutive days. This 4,050-mile run is over a course of more than 12 miles, eleven circuits being made every day. The illustration shows the start in front of the Pontchartrain hotel, Detroit. Mayor Oscar Marx is seated beside M. A. Crocker, the driver

Headlight Question Is Taken Up by Engineers

S. A. E. Makes Light Problem National Issue

NEW YORK, April 11—The headlight question is becoming a national affair instead of the strictly local one of municipal regulation. The standards committee of the Society of Automobile Engineers last week devoted a considerable portion of its time to this phase of the lighting problem in the first of its quarterly meetings. The headlight question came up in the report of the electrical equipment division and brought on a long discussion of the best methods of controlling the rays of the lights so as to insure comfortable and safe driving. Though no definite action was taken, the fact that the subject was given so much consideration shows that interest is being aroused. This division also took up the matter of installing fuses in circuits from storage batteries.

Engineers Discuss Headlight Dimmers

The Society of Automobile Engineers has just brought to a successful conclusion the first of its quarterly meetings of the standards committee. Heretofore the meetings of the standards committee have been held semi-annually just prior to the national meetings of the whole society. The purpose of the new plan, which has been inaugurated during the administration of President Henry M. Leland, is to make possible broadening the scope of the standardization work which has met with such general approval including that of the car manufacturers.

During the convention of last week meetings of eleven of the active divisions or sub-committees of the standards committee were held. Most of the reports were of a "progress" nature. In fact none of the recommendations under consideration can, under the rules of the society, be accepted by the society officially until the recommendations have been made final and specific, approved by the council and formally discussed at national meetings of the society at which time votes are cast by the members having voting power on the acceptance of practice recommended in reports of divisions of the standards committee.

The springs division is formulating a table of axle clips for use on pleasure cars, with the idea of reducing the number of sizes and submitting a design of clip that will represent the best engineering practice.

The committee appeared to favor the use with center bolts of springs of United States standard hexagon nuts tapped with S. A. E. screw standard thread.

The prospects are that the iron and steel division will recommend that about half of the previously accepted eighty specifications of S. A. E. steels be eliminated; also that in the case of some steels the previously accepted content of phosphorus and sulphur be raised.

The data sheet division which has in charge the issuance of supplemental and superseding sheets for the S. A. E. handbook of standards at its last meeting formulated recommendations as to methods of disseminating widely at nominal cost copies of the official version of S. A. E. practices. The present data book is of approximately the same size as other data books and is more convenient for use in drafting rooms and filing as well as more convenient for carrying, than a book of greater length and width would be. A great deal of matter thus far printed and to be printed in data sheet form can be put on the present size sheet to very good advantage and it does not seem desirable to provide large sheets for the comparatively small percentage of material which cannot be put conveniently on the present size sheet.

It was decided by the motor testing division to draw up a code for use in connection with the conduct of motor tests.

The miscellaneous division recommended the spark plug with larger hexagon head to permit the employment of larger porcelains without disturbing interchangeability with the previously accepted standard, the A. L. A. M. spark plug the name of which was changed to S. A. E. some years ago. A complete table of dimensions of pins for S. A. E. standard rod and yoke ends was submitted.

The nomenclature division limited its proceedings to formal discussion as to the plan and scope of future activities to be entered upon. A vote was passed requesting the council to instruct the various divisions of the standards committee to refer all questions involving nomenclature to the nomenclature division for action. The division is cooperating with the nomenclature committee of the British engineering standards committee, which is supported by the English government and represents the leading engineering societies and firms of Great Britain.

Electric Vehicle Division Meets

The meeting held last week was the first one of the electric vehicle division. The division proceeded with temporary organization, being in consultation with delegates from the Electric Vehicle Association standardization committee. It was the sense of the meeting that the Society of Automobile Engineers should be requested to have more electric vehicle representatives on the different divisions of the standards committee where the work is common to both types of vehicles.

The pleasure car wheels division expects to make recommendations which will reduce the commonly used sizes of pneumatic tires to twelve, in any event not more than sixteen. At the present time some of the tire companies are listing fifty different sizes.

The British standards or rim sections which are in force in Europe today and which it was reported had been approved by the Clincher Automobile Tire Manufacturers' Association for millimeter sizes were considered. There were some apparent discrepancies in the stated tolerances from precise measurement of the British standards upon which more information is being sought.

A number of wheel makers attended the meeting of the pleasure car wheels division to take part in the discussion of the possibility of standardizing wood wheel dimensions and felloe bands for pneumatic tires. A number of drawings and sketches were submitted to elucidate the subject, the situation as to which appears at this time to be that it is probably feasible to recommend two sets of dimensions which will cover the practice.

The ball and roller bearings division has started upon the task of reducing the number of stock sizes of roller bearings in the case of these so-called short sizes which are not interchangeable with the dimensions which have already been accepted for ball bearings.

S. A. E. standards almost generally are used and reduce or simplify labor in the engineering, production and service departments. The money saving effected by the reduction in labor and the facilities with which materials can be secured, can be estimated and is large. The members of the society practically unanimously favor standardization along sound lines to a degree that will not hamper the individuality of the engineer. Recommended practices of the society have been of incalculable benefit to the motor industry at large.

GENERAL MOTORS PROMISES PROFIT

New York, April 13—The manner in which General Motors gross sales and net earnings have been running for the last 8 months makes it within the range of probability that the full year to July 31 next will show the total of \$10,000,000 of net profits. This would mean a balance for the \$16,500,000 common of slightly better than 50 per cent against 39 per cent in the 1913 year and 17.4 per cent in 1912. It is understood that gross sales so far this year are about \$6,000,000 ahead of last.

CLAIMS WORLD'S LARGEST ORDER

Springfield, O., April 13—In closing a contract for 104 5-ton and one 2-ton Kelly-Springfield trucks with the Pacific Motor Coach Co., of Los Angeles, Cal., the Kelly-Springfield Motor Truck Co. of this city claims to have made the largest sale of motor-driven vehicles direct to the consumer ever consummated. The order is said to represent \$500,000, and accompany-

ing it was a certified check for \$100,000 as a deposit.

The Pacific Motor Coach Co. is capitalized at \$5,000,000 and has its headquarters in the Storey building, in Los Angeles. The purpose of the company is to furnish motor bus service between Los Angeles, Venice, Long Beach, Pasadena, San Pedro and other nearby points. Thirty of these trucks will be in operation July 1, and the balance of the order will be delivered at the rate of twelve per month until completed. The bodies, which will be built by the St. Louis Car Co., of St. Louis, Mo., will be of the double-decker type of special design, similar to those used in New York and London. Each bus will seat fifty-four passengers and every passenger is guaranteed a seat.

PACKARD REPORTS BIG BUSINESS

Detroit, Mich., April 9—Packard sales for the 7 months to April 1 were 40 per cent ahead of last year. Truck sales are somewhat smaller than a year ago. The company has decided to close its shipping season on June 30. No cars whatever will be shipped out of the factories during July and August. In previous years July and August have been important contributors to the year's overturn. But the company, for trade reasons, has decided to rearrange its yearly cycle, shipping its products in 10 months and creating a selling vacuum of 2 months, to get its wind and go ahead with the production of the next year. Its immediate effect will be to cut down the gross and net results of the current fiscal period and swell the earnings of the 1914-15 year.

ENTZ TO BUILD CARS

New York, April 13—The Entz Motor Car Corp., of this city, has been incorporated for \$3,000,000 to produce a number of cars featuring the Entz transmission. The incorporators are Adolph Widder, W. B. Harding and R. H. Montgomery. It is understood that R. M. Owen will assume the presidency and that Roy Rainey will become vice-president. The company is at present working on the first batch of cars at its laboratory established several months ago at 136 West Fifty-second street, this city. These cars have six-cylinder motors, one size with cylinders measuring 4 by 5.5 and another with cylinders 3.63 by 5 inches. They have a wheel-base of 130 inches and five-passenger bodies.

KELLY-SPRINGFIELD PLANS

New York, April 13—Directors of the Kelly-Springfield Tire Co. have taken preliminary steps in a plan for the retirement of the 4 per cent income debenture bonds of the company by issuing therefor a like amount par value of 6 per cent cumulative preferred stock on a basis of one share of stock for each \$100 face value of the bonds; also a plan for refunding the 78½ per cent of dividend accumulated upon the present issue of 6 per cent preferred stock

by the issuance of 7 per cent cumulative second preferred stock, each share, if authorized, to be converted into one share of common stock at the option of the holder at any time before July 1, 1924.

A special meeting of the stockholders will be called May 4, to take action on the plan, and to authorize the increase in the preferred stock, and the increase of common stock which will be reserved to take care of the conversation privilege of the second preferred stock. The plan is to become operative only if in the opinion of the directors a sufficient amount of bonds are deposited and offered for exchange.

KANTALEVER CASE SETTLED

New York, April 13—The Motor Car Equipment Co., sales agent for the Kantalever emergency spring repairer and sole owner of the basic patent, has come to an agreement with William Wooster, trading under the name of the Auto Surplus Stock Syndicate. The Motor Car Equipment Co. brought action February 19 against the defendant for infringement of patent 902,250 issued to D. P. Power, October 27, 1908, covering the Kantalever emergency spring repairer; as the defendant failed to answer, the bill of complaint was taken pro confesso by Judge Hough in the United States district court, southern district of New York.

FORD BREAKS PRODUCTION MARK

Detroit, Mich., April 13—During the 26 working days of March, the Ford Motor Co. plant in this city turned out 28,700 cars or over 1,100 a day. The figure marks a new record for the factory and compares with 24,621 machines produced in February. The factory received orders for more than 12,000 machines one day early this month and operations are still far behind bookings. Reports from the Ford mills at Ford, Ont., and Manchester, England, show that the business of these two companies is proportionately as brisk as at the American plant.

MAXWELL TWIN PARTS AVAILABLE

Detroit, Mich., April 12—The 30,000 and more owners of two-cylinder Maxwell cars, formerly made by the Maxwell-Briscoe Co., will be glad to learn that the present Maxwell Motor Co. is now prepared to furnish from its parts plant at Newcastle, Ind., repair parts for all cars made at the Tarrytown, N. Y., plant prior to the acquisition of that plant by the Maxwell company.

The Maxwell Motor Co. and the Carlson Motor and Truck Co., whose patent the two-cylinder Maxwell motor infringed, have reached an adjustment and the Carlson company has given the Maxwell Motor Co. an exclusive license under this patent.

RIM BATTLE THREATENED

Chicago, April 13—Purchase of the Dorian Rim Co., demountable rim patents by the Universal Rim Co., of Chicago, which

also includes the Funk and Anglada patents will be followed by renewed activity by the Universal company. It is stated that this concern expects to have granted May 5 ten patents covering the rim situation pretty thoroughly, following which action will be taken against at least four concerns which are said to infringe patents controlled by the Universal company.

CRAWFORD SUCCEEDS STROUT

Kokomo, Ind., April 14—Robert Crawford, for some time past advertising manager of the Haynes Automobile Co., has been promoted to general sales manager, vice George H. Strout resigned. S. A. Merinbaum, formerly assistant to Mr. Crawford, has been placed in charge of the advertising department.

CREDITORS' COMMITTEE NAMED

Philadelphia, Pa., April 10—The creditors' supervising committee of five for the Standard Roller Bearing Co. has been selected. This committee, which will have the power to liquidate the concern at any time should such course seem desirable, is as follows: Joseph Wayne, Jr., W. C. Potter, Herbert Du Puy, J. P. Lee and C. T. Taylor.

SWEDEN TO MAKE CHEAP CARS

New York, April 13—Cables from Stockholm state that a determined effort is being made by Swedish interests to challenge the pre-eminence of American cars in that market. A new Swedish company with strong financial backing is erecting large factories at Norrköping, which is called Sweden's Birmingham. It will make a specialty of a 20-horsepower car which will be sold at less than \$800, in direct competition becomes first vice-president.

MILWAUKEE PLANS TRUCK PARADE

Milwaukee, Wis., April 14—The Milwaukee Automobile Club is planning to conduct a mammoth motor truck parade and demonstration in Milwaukee on Memorial day, May 30, and preliminary plans are now being made by Oscar Stegeman, chairman of the runs and tours committee. Mr. Stegeman is president of the Stegeman Motor Car Co., truck manufacturers, Milwaukee. The idea of the parade is to awaken the citizens of Milwaukee to the enormous growth of motor trucks in this city, and the great variety of uses to which they are put.

FREDERICK ROBINSON RETIRES

Racine, Wis., April 14—Frederick Robinson, vice-president of the J. I. Case Threshing Machine Co., Racine, Wis., since its reorganization as a \$40,000 corporation in 1897, has resigned and will spend several years in world-wide travel. Mr. Robinson retains most of his financial interest. He is a brother-in-law to Frank K. Bull, president of the company. F. Lee Norton, general manager, becomes first vice-president.

'Round the World With Kerosene as a Motor Fuel

Part III—Paying Our Respects to Germany, Russia and Austria

By Edwin P. Kohl

REMEMBERING Napoleon's sad experience in his retreat from Moscow just a year more than a hundred years ago, we made haste to get over the northern part of Kaiser Wilhelm II's domain and enter the vast realm of Nicholas II before a similar fate should befall us. With a slight rain heralding the approach of colder weather, we chugged out of Frankfurt for Berlin. A thin layer of mud covered the hard roads which gave our vacuum cup tires a picnic in pelting us with the dirt they sucked up. By the time we were out of sight of the River Main, the Henderson was undistinguishable from a big flying chunk of mud.

The first hundred miles of the journey was rather uninteresting because of the absence of large cities and the lack of historical associations. The numerous German "dorfer" through which we passed gave us a good opportunity of studying country life at first hand. The farmers of northern Germany do not live each on his own property but congregate in small villages where they have their church, school and shops close at hand. As the amount of land owned by each person is not great, it is possible for them to go to and from their fields around the "dorf" without the inconvenience which would accompany this system in America. Life in these villages is rather narrow and mediaeval. The same methods, dress and customs still exist which the fourth generation back had. Oxen and cows are the common beasts of burden. They are slow-moving animals and often when out on the fields plowing, the observer has to line them up with a stable object to perceive if they are moving. These quaint people are hospitable



Getting ready for the day's run after spending the night in a tent in Austria-Hungary

Editor's Note—This is the third of a series of articles on a globe-girdling tour now being made by Edwin P. Kohl, a former University of Wisconsin student. The remarkable feature of the trip is that kerosene is the fuel that is being used in the Henderson Kohl is driving

and courteous. They greet each passing tourist with a salute or the removal of the head-gear. This obeisance makes an American feel like a potentate of old.

Bad Roads Encountered

Towards the end of the day's run, we neared Eisenach after passing between the Vogels gebirge and the Rhön gebirge (monuments), Gotha and Weimar were our next objective points. At Erfurt, we attempted a short cut to Eisleben, the birth and death place of Luther, and thought we were back in the time of the Reformation, judging by the condition of the roads. We were thankful that we had 45 horsepower in our motor or we might have had to remain there for a few weeks waiting for the roads to dry. The earth in that part of Germany is a heavy black clay which gets as soft and sticky as some of our western highways in the spring. Ordinarily, all motoring roads are macadamized or paved in Germany, but the government has

evidently overlooked this cross between low tide and a cow path. Fortunately the car stood up well under this strain for 40 miles until we were again on the Leipziger Chaussee.

The garage men in Leipzig insisted that the car needed a wash for which we, as Americans, should pay double. We contended that he should clean it for the value of the rich dirt which clung to it so profusely. As the car had not faced the hose since arrival on the continent, we began to take an uncanny pride in its mantle of

dirt from five nations and postponed its bath for a few thousand miles more. From the advertising viewpoint of attracting attention, it certainly had Elbert Hubbard's copy licked. The Germans try to keep everything scrupulously clean and their motor cars usually look like a recent purchase. The around-the-world Henderson was an enigma to them and the garage where it was kept in each town was always a Mecca for sight-seeing crowds and curious motorists.

The route to Berlin now lay through Wittenberg and Potsdam. At the former place, we crossed the Elbe river while at the latter, the palaces of the kaiser were the objective points of interest. A beautiful artificial fir forest extends for miles between Potsdam and Berlin. Passing through it was a good introduction to our drive on Unter den Linden a little later. As it was still early in the day, we drove to the various points of interest to get our pictures and see how nearly Berlin resembled Chicago; the two having about the same population. Incidentally, it gave the inhabitants an opportunity of inspecting a new make of American car. Germans are very conservative about buying foreign-made cars, either because of industrial patriotism or their confidence in the superiority of "made in Germany" goods but they are always eager to observe what features foreign cars have. The kerosene carburetor was the particular topic of discussion, for most German garagemen have not even heard of kerosene—called petrol in Germany—being used as a motor car fuel.

Germans Interested in Kerosene

As gasoline—labeled essence—costs from 40 cents a gallon up while kerosene can be bought from every grocery for less than half that amount, the interest is a live one as tickling the purse. The German-American Oil Co., from which we bought our fuel in Germany at wholesale prices was particularly animated over the possibilities of the new fuel.



"Winter is here winds whistle shrill." So much for poetry but what would you say if you had to stop when the weather was 10 below the sidewalk?

"Russia or bust" was our slogan out of Berlin and but for this good resolution, we might never have crossed the boundary of that dismal land. We were strongly advised against entering but since we had Russia included in our itinerary painted on the hood of the car, we wanted at least to keep our record complete. The trip through the flat north German country was very monotonous from a motor tourist's viewpoint and we lost no time in reaching Posen, near the border. The two countries would not have to erect stone pillars to mark the boundary, for the traveler is no sooner across the line than he feels that he is in a different part of the world. The hard, shady military roads of Germany become memories; the poverty of the Russian peasants impresses itself on the mind; the stolid appearance of the people shows the resignation with which the lower class has accepted the fate allotted to them for gen-

Prague was what was the quickest way to get back to Germany or any other civilized country. We even omitted passing through Pilsen and Budweis; old American friends of ours.

Remembering that the Sistine Madonna by Raphael hung in the Dresden art gallery, we manipulated the steering apparatus in that direction instead of going directly to Nuremberg and southern Germany. The next day was Sunday which would give us a good excuse for resting from our strenuous journey of the past week. When we crossed the line into Germany, we gave such a lusty shout of joy, in English, that the Austrian customs officer thought we were jeering at him and took us into custody. After many efforts to explain, we finally said that our shouts was the American way of saying "Hurrah for Franz Joseph of the mighty land of Austria-Hungary" or words to that effect.



Passing under an exceptionally long railway viaduct at which time we wished that motor roads might have viaducts, too, thus avoiding extremes in hills and valleys

erations. We feared the attitude with which officials and civilians alike regarded us, so slept in the tent along the road that night. Zdunskawola was the next town but we did not get that far, for we took a short cut for Szezyporno on the German border and were thankful that we were not on our way to Siberia in chains for swearing at the czar's roads. Before night, we were in Breslau.

Running Through Bohemia

After seeing the university and going through the famous museum there, we started for Prague and Vienna in Austria. Soon after crossing the border, where we were considerably delayed by the red tape of the officials, we lost the main motor road and then began a weary grind through Bohemia over poor roads, worse roads and no roads at all. The sight of the high poles in the hop fields often made us wish that our roadster had an emergency equipment for using stilts in roads like those. Long before we reached Prague, we were agreed that if we would go to Vienna, it would be by rail. The first thing we asked of the first man on the first street in

That pleased the soldiers around him who smoothed things over and we were allowed to proceed to the German customs house a little further on. We arrived in Dresden too late to hear a famous symphony orchestra that night, but satisfied that we were again in Das Deutsche Vaterland.

MISSOURI ROAD LAW UPHELD

Jefferson City, Mo., April 11—The supreme court of Missouri in session last week declared the special benefit road district law constitutional. The decision was written by Justice Woodson and is a great aid to the good roads movement in this state. In an opinion of the court en banc Judge John C. Brown, who wrote the decision, then declared the law unconstitutional.

On the rehearing of the case Justices Graves, Bond and Walker concurred with Justice Woodson and Justice Brown again dissented. Justice Farris did not sit with his colleagues and Chief Justice Lamm refrained from entering into the decision because of doubt.

The case came from Clay county, where

W. S. Embree and others filed briefs declaring the law was not valid and contesting the validity of a \$77,000 bond issue of the Kansas City and Liberty boulevard road district. There are between fifty and sixty of these districts in the state, more than thirty of which have issued bonds which in the aggregate total about \$12,000,000.

NEW YORK'S STOLEN CARS

New York, April 13—The value of the stolen motor cars in Greater New York last year is estimated at \$500,000. These machines were recovered by the insurance companies, which had issued policies to owners covering the machines, by the payment to the thieves of certain sums of money, demanded for their return. Perhaps \$200,000 might be added to the above amount as the value of cars stolen here and not recovered, some of them being insured and others not. Taking all the cities in the country together it is believed that the total value of machines stolen in the United States last year is not far from \$1,500,000.

This city heads the list of cities in the United States where cars have been stolen in 1913 and Philadelphia comes next. Considering the size of the city, a very large number of motor cars were stolen in Newark, N. J., last year.

SIDECAR SOMETIMES MOTOR CAR

Hartford, Conn., April 11—A motorcycle ceases to be a motorcycle under the Connecticut law when the owner attaches a basket or a sidecar fitted with a third wheel. Such is the opinion handed down by Attorney-General John H. Light in response to an inquiry from Secretary of State Albert Phillips. When a basket or sidecar and a third wheel are added the motorcycle under the state law becomes a motor vehicle.

The term motorcycles is defined in section 1, chapter 85 of the public acts of 1911, as follows: "Motorcycle shall mean a motor vehicle having but two wheels in contact with the ground." "Hence a motor vehicle having three wheels in contact with the ground is not a motorcycle in the meaning of the law," says the attorney-general, "and for that reason it must be classified under the general heading of motor vehicles and a dealer in such vehicles should be required to register as a dealer in motor vehicles and pay the regular fee of \$50 under section 4 of chapter 135 of the public acts of 1913."

However, dealers in motorcycles may well contend that they are selling two distinct articles, the motorcycle itself and the sidecar or basket separately and as an accessory. But the owner and user of a motorcycle, though he may use his mount infrequently as a tri-car, must pay the motor car license. The motor car registration applies to all motorcycles fitted with delivery boxes.



Cyclecar Development

A Week-End Tour in a Cyclecar

By William B. Stout

WE ploughed through 11 miles of fresh crushed stone on high gear, including two very steep hills.

We ran over 6 miles of road just scraped up into the middle, sod and all, with the bottom of the car taking sod with it part of the way, but keeping our 20-mile speed for the distance.

We raced a five-passenger, \$1,000 touring car with four in, for 6 miles, with four sharp turns and a mile of crushed stone, and beat it in a mile. The radiator of the touring car was boiling at the end of the run.

Runs on Flat Tire

We fixed two blowouts within 20 miles and came into town at 11:30 p. m.—an 8-mile run on crushed stone—on a flat tire, the tools having been left on the running board and lost on the road. The inner tube of the flat tire was vulcanized

light of our 2-volt generator headlight and found it great sport.

Such is the summary of a trip 95 miles and back—with qualifications—made in an experimental cyclecar of 36-inch tread and tandem seating, from Chicago to Kentland, Ind., over a recent week-end.

The car used has a shaft drive to a friction layout back of the rear seat, whence a short chain carries the power to a rigid axle with no differential. The long shaft is inclosed in a tube, and rocking this tube by footpedal gives the clutch effect. A V air-cooled Mack motor is fitted, and though we ran for hours on half-open throttle and retarded spark in the heavy pulling, and opened up wide for some of the crushed stone hills—fresh stone, mind you—the motor gave no sign of overheating.

the gear ratio was cut down and the speed and pick-up bettered.

Then oiling trouble developed, and the pump was set to flood the motor all the time, being shut off when it smoked too much. After this there was no trouble until warm weather started, when it was thought advisable to add a centrifugal blower to the main shaft, to draw air down over the cylinders for better cooling. It took several weeks to get this fan working right. Then the electric generator drive proved too low in gear, and this was fixed. By this time the car had received a lot of punishment, but still gained in performance, running better every day.

When the car was developed so that it ran for several weeks without fixing, it was time to try country work, so we started out, but with an old set of cheap tires, a new set being carried behind for replacement, with two new tubes.

The start was made from Chicago about 3:30 p. m., and the first trouble was met at South Chicago, where a rear tire went down. We stopped and changed to a new one, leaving our array of tools on the running board when finished.

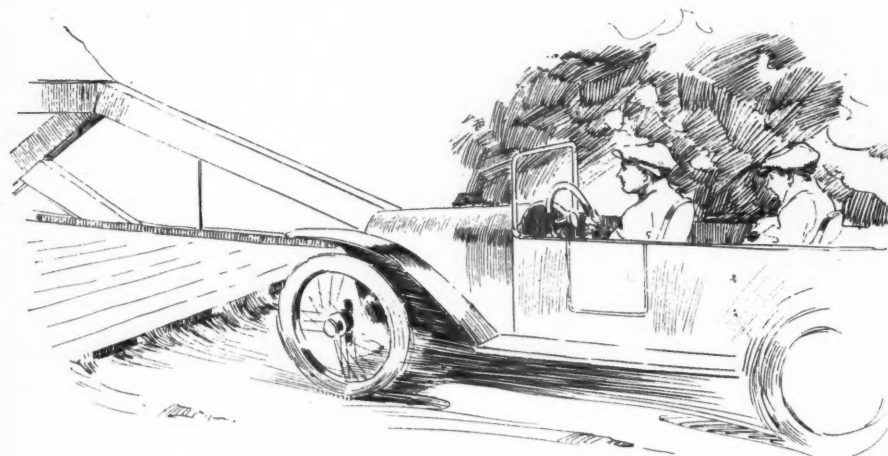
Delayed by a Train

Off again, we ran through Hammond, stood half an hour for a string of freight trains and when the gates went up, took the lead from the following cars and held it into Schererville. Here we took the wrong turn over a railway and when we hit the next town found we were 4 miles off the route. We took a shortcut however, and setting the needle on 30 miles per hour, rolled into Crown Point just at dusk.

Here we had the spare tire vulcanized and a slow puncture in the front tire fixed, while we partook of a juicy beef-steak at a nearby hotel. We left at about 7:30 by the light of the electric headlight, operated by a generator on the magneto bracket, the light being in the center of the hood. Two small sidelights were arranged to comply with the law and at the same time light up the interior of the car.

Crossing the Kankakee river near Shelby, we soon hit real roads. The usually good stone road was scraped up, the sod along the edge having been scraped to a line in the middle of the road. This line we straddled, and winding back and forth, we neatly leveled off the tops of the bigger sod chunks as we bowled along at 20 for about 7 miles.

Here we struck a road of fresh crushed stone, a real test. This continued for several miles, then on a better stretch we rolled over a bridge and dropped into a



A stop for a bridge approach is rare for a cyclecar. Such bump makes small impression on the long spring action, while the cars are devoid of throw

next day for the blowout and is in running shape again.

The far end of a bridge, hiding a 13-inch hole, we dropped into it neatly at 25 miles an hour, bending the steering spindles. Borrowing a rusty chisel as the only existent tool, at a near farmhouse, we fixed the steering gear and went on. Coming back we slowed up at that bridge.

We proved that the 36-inch tread was fitted to every-type of road we met, and could pull through at a speed equal to that of big-car average, and with greater comfort for the same road. Crushed stone was the worst condition yet met, and took considerable throttle, but this did not hinder getting through and in comfort, at a 15 to 20-mile speed, and with a cool motor.

We drove 4 hours in the dark by the

If an air-cooled motor is handled right it is just the thing for this type of work, and whether the future twin cyclecar motor is water-cooled or not depends on how much knowledge the makers and dealers have of air-cooled motor practice. But this for later.

Trip to Try Out Car

The idea of the trip was to try out an experimental cyclecar built by the writer, to test it on really rough and fast going, after some 1,200 miles of city work had proved what it would do there. The city work had brought out a number of minor defects which had been remedied. The main shaft had been noisy at first—this was fixed. The strap joint developed a knock, a new type was made which cannot knock. The gear ratio proved too high, for the motor even at 40 miles an hour did not turn over at its rated speed;

hole at the far end, this having been dug out for repair and left over Sunday for final filling. We hit the hole at 25 miles an hour but did no more than spread the front wheels out a trifle. To fix the spread, we opened the luggage carrier in the streamline tail of the car to find that we had not a tool, not even a tire patch, for we had left them on the running board at South Chicago and they bounced off. The only screwdriver we had was a dime, and this we bent up trying to loosen the screw adjustment. At last we drove on a mile with the wheels spread, and finding a house borrowed an old rusty wood chisel with which we fixed the damage.

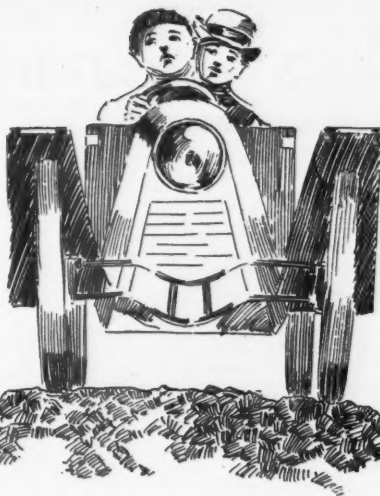
A mile further on a sudden pop told us of new trouble, and the left rear tire was down. We were on crushed stone again with no tools, no patch, no stick-um, and could not even take the inner tube out, though we had a new casing. We had 8 miles to go to Morocco and this we did on a flat tire, my passenger sitting on the running board on the side where the tire was good, adding greatly to my acrobatic tricks in steering but saving the tire, and allowing us to do 20 miles an hour on the rough stuff.

Snowstorm Encountered

By this time it had turned cold and was snowing, the windshield was caked up and we were getting really enthused on night driving in a cyclecar in the winter time. The road got worse every mile, and a night road is hard to pick. The motor chugged along contentedly, however, never complaining, except for a conk or two after topping a big sand hill, and finally landed us in Morocco at 11:30 p. m. without mishap.

Here we stopped for the night, and next morning had the tubes and tire repaired and started out of the garage to find a party of friends in a big car come to meet us. Here I changed passengers, for the young woman driving the big car wanted to see what a cyclecar was like, and my erstwhile passenger took his seat at the wheel of the big car for the remainder of the journey.

We started even for the 7-mile run to the farmhouse where we were to stop for a few minutes visit. The road was narrow, but good for us with rough ruts in



On this road the big car had to stay in deep rough ruts, while the cyclecar chose as fine and level a track as one could wish

which the big car had to run, and had about a mile of crushed stone. There were four sharp turns. On the good road I took the smooth part with the 36-inch tread and did not slow down much for turns, these being taken at 20. On the straights the needle was on 30 most of the time, but the following big car was at 35 on the straights on account of having to slow more for turns and the roughness of the track it had to follow. In the crushed stone it gained again, but when we arrived at the farmhouse the cyclecar was a mile in the lead. The driver of the big car declared that he traveled as fast as he could and hold the road and his passengers.

From this stop we ran to Kentland, passing a small car on the way, in 14 minutes running time. The 13 miles between Morocco and Kentland was covered in 24 minutes—not bad for a 9-horse power air-cooled motor.

The return was made that noon at about the same rate, the trip being but a repetition of the out journey, except that we were surprised to take the steep, rough hills on high with ease. We got off the road near Shelby, half way home, and had to run back 4 miles. At Shelby as we slowed, making a turn a rear spring gave way and let the rear end down. This put an end to the return trip for that day, and we were a sad pair at having to lose the best of a bright

sunny day just as we got to the good roads. A trip to town was made for a new spring, and the journey completed later—but that is another story.

The breakdown was due to two defects, first, of the material in the spring, which was very poor in fracture, and second, to a fault in design, the lower leaf being unsupported where it fastened to the bearing housing. The spring was a cantilever and of course when it went the car had no rear support left. Radius rods now are being fitted to take care of any absolute stoppage in case of spring trouble, and to overcome the objections of this type of spring. As a riding spring it has every advantage of comfort and lack of rebound. And so we learn. The experimental car of today

is the basis of real road work tomorrow, and yet, while we had tire trouble and a broken spring to hinder, we had no power or transmission trouble.

RAYFIELD'S UNIQUE FEATURES

The Rayfield Motor Co., of Chicago, is building a small car to meet the cyclecar movement, which has a number of interesting features, and a very simple and efficient chassis. The car is a standard tread side-by-side seater. This firm is building its own motors, power plants of the four-cylinder water cooled type with a bore of 2¾ and a stroke of 3½ inches. This is cooled by the thermo-siphon system, and develops 14 horsepower.

The frame of the car is made of steel tubing suitably braced and the suspension of the motor is very neatly carried out by fastening to tubular cross members

Answers to Inquiries

Four-Horsepower Motor

MORRIS, III.—Editor Motor Age—Would a 4-horsepower motorcycle engine have sufficient power for a cyclecar with 26-inch wheels?

2—What would a 12-inch friction transmission cost. Axles for 36 or 40-inch tread?

3—What gear ratio would be advisable with the above motor and wheels?—C. W. Bartlett.

1—Yes, although 28-inch wheels would take less power. With this motor you had better build a single-seater, and of 36-inch tread or under.

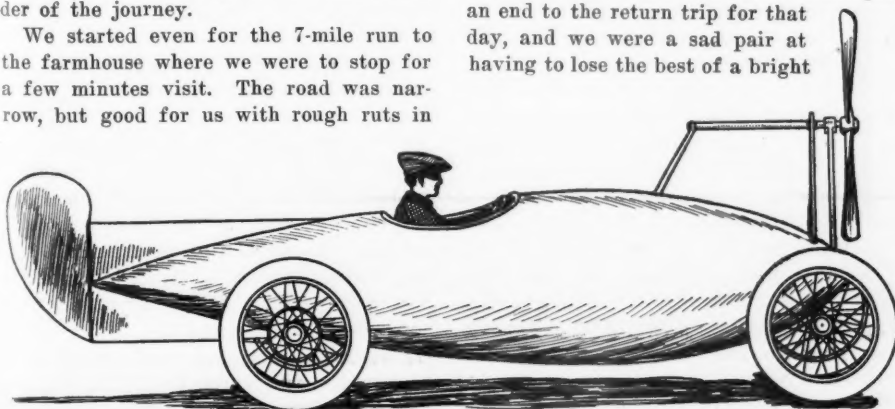
2—About \$15. Tubular type about \$1 apiece.

3—Five to 1 on high, and 8 or 10 to 1 on low.

Propeller for Cyclecar

Indianapolis, Ind.—Editor Motor Age—Would a 3½-foot propeller, driven by a 3-horsepower motorcycle motor, be able to pull a small cyclecar weighing about 250 pounds? How fast would the machine be able to go?—R. A. Conner.

On the level in a calm or with the wind, it should do 30 miles an hour. The propeller should be larger. The pitch of the propeller should be accurately designed to the r. p. m. of the motor and the body of the car streamlined like an aeroplane.



Cyclecar with Propeller Attachment



The Readers' Clearing House



LONG-STROKE MOTOR COMBUSTION

Better Than in Short-Stroke—Reasons

Given—Fire Arm Analogy

BEEMER, Neb.—Editor Motor Age—Will a short-stroke cylinder give as complete combustion of the charge as a long-stroke cylinder? Take a 22-caliber cartridge and shoot it from a pistol having a 5 or 6-inch barrel and it will not have as much power as when shot from a 24-inch barrel.

2—At what point in the power stroke do the gases generate the greatest power?—G. Sharp.

1—The long-stroke motor shows more complete combustion of the charge than the short-stroke. When the spark occurs its heat is transmitted to a molecule of the gas, let us say, and for all practical purposes this is correct. The molecules of the gas being in communication with other molecules, the heat is passed from one to the other until each molecule is burned or exploded. This action is known as flame propagation or flame spreading. Assuming the same displacement, in the short-stroke motor the passing of heat from one molecule to another takes place through the time t , let us say, while in the long-stroke motor this time is increased considerably, to T for example. Then in the long-stroke motor the heat will be transmitted to the whole charge for a period $T-t$ greater than in the short stroke. In other words, the greater the length of time the charge is in contact with a heated element, the more complete the combustion up to the point where all is burned.

There are a number of things, however, which must be considered in the discussion of flame propagation in long-stroke motors, one of the important ones being ignition. With two-point ignition or two sparks occurring in the cylinder at the same time in the short-stroke motor, and only one spark in the long-stroke, the flame propagation may be the same, or even better in the short-stroke. Carburetion should not be forgotten and it is assumed above that in both examples the carburetion and ignition is identical.

Your comparison of the long-stroke motor to the long-barrel gun is of worth. The reason the long-barrel gun will give the cartridge greater penetrating power is because the force acting behind the bullet, which is the same in both cases, is acting for a greater length of time in the long-barrel gun. The same holds true in the long-stroke motor. The molecules are given a greater length of time to all be consumed and to exert their energy on the piston.

2—The greatest power is obtained the instant after explosion takes place.

Disk Clutch Gives Trouble

Delhi, N. Y.—Editor Motor Age—Regarding my Buick model 26, 1911 model. I have had trouble with the clutch, which is a multiple disk. It refuses to release and also is inclined to slip, although the latter trouble has been remedied by adding another spring, which, how-

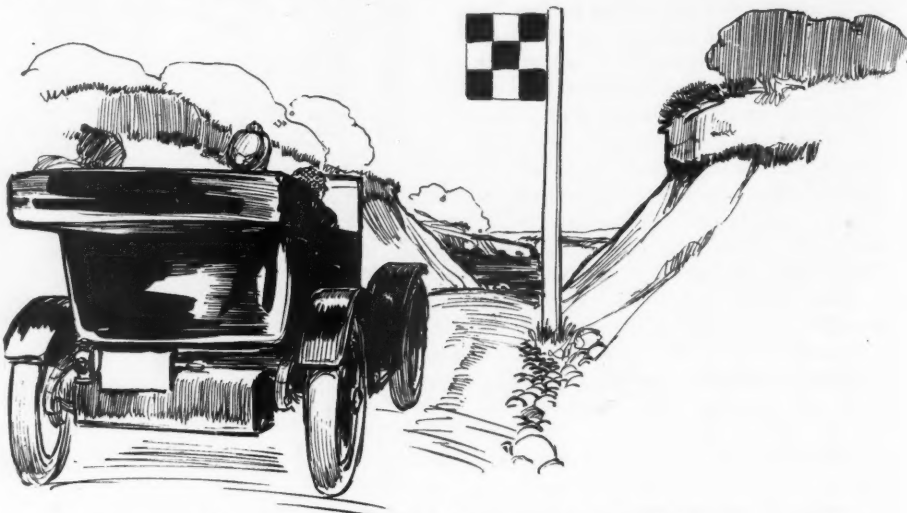


FIG. 1—SIGNAL SYSTEM SUGGESTED BY READER

A checkered sign should be placed a reasonable distance from all dangerous crossings or turns. The sign should be the same in all states of the union so that a western motorist in the east will understand the signal

ever, is so stiff that it is very hard to hold down. I have washed the clutch repeatedly with kerosene, used all kinds of oil, even cylinder oil and kerosene in equal parts, with no improvement. It is impossible to get into low speed without going into reverse first, and unless the brake is applied, the car will move with the clutch pedal fully depressed. There seems to be no way to adjust it differently. Would it do any good or any harm to remove one or two plates?—H. J. Goodrich.

Do not remove any of the plates and if you cannot prevent the clutch from spinning by adjusting the spring, you will have to make some sort of clutch brake. Such a device automatically stops the clutch from spinning when the clutch is released. The use of thin cylinder oil and kerosene should help. You might try shortening the clutch pedal throw, or if this is not possible even by altering the pedal and connections take the car to a Buick agent and have him measure it for a shorter pedal.

MAGNETO VS. BATTERY IGNITION

General Features of Both Systems—Types

Used on Two Cars

LeSueur Center, Minn.—Editor Motor Age—What are the advantages and disadvantages of storage battery and magneto ignition?

2—What kind of a system does the Cadillac use? Is it on the same plan as the Studebaker?—A Subscriber.

1—The advantages of magneto ignition are; that an inexhaustible source of current is supplied, which current increases with the speed of the motor so that at high speeds when a quick, hot spark is desired, there is sufficient current due to the rapid rotation of the magneto armature, to supply it. The disadvantage is, that until the magneto armature is revolving at a certain speed, which depends upon the magneto and its connections to the engine, it will not develop current enough to cause ignition. This sometimes makes starting difficult where the magneto alone

is used, although where there is a single system employing the magneto alone, it always is of a special design to give a good spark at low crankshaft speeds.

A storage battery, on the other hand, will supply current whether the engine is running or not, consequently it will facilitate starting. As the current is not dependent on the engine in any way it consequently does not have the advantage of increasing with the engine speed. Secondly, it must have some means of renewing its current-giving ability, that is, there must be some means of recharging, whether by a generator on the car or by some outside means.

2—The Cadillac uses the Delco system, which also supplies the lighting and starting functions. This system is a dual with a single high-tension distributor. The source of main ignition current is the generator which charges the storage battery. Up to 280 to 300 revolutions per minute, the ignition current comes from the storage battery, above that speed the current comes from the generator. For ignition purposes the generator performs not only all the functions of the magneto, but possesses even greater efficiency, having more flexibility and a greater range of action. At low speeds it is supplemented by the storage battery and auxiliary current is furnished by six dry cells for starting and emergency. The disadvantage of battery systems as a whole is obviated by the automatic spark advance, by means of a ring governor, which is one of the features of the Delco system.

The Studebaker ignition also obtains its source from the starting and lighting battery as well as from the auxiliary set of dry cells. Current from the storage bat-

tery is sent through a coil and distributor, the generator automatically charging the storage battery and serving the same purpose as the magneto.

LEAN MIXTURE CAUSES BACKFIRING Reason Given for This Action—Engine Shows 88 Percent Efficiency

Denver, Colo.—Editor Motor Age—Why is it that a motor pops back in the carburetor? I know that the mixture is too lean, but there has been an argument as to the action in this case. Kindly give an opinion on same.

2—What are the comparative efficiencies of the gasoline and steam engines?—A Subscriber.

1—Either an over rich mixture or a lean mixture instead of exploding will burn and the flame from the burning gas will ignite the incoming fuel in the cylinder the moment the intake valve opens. Since the valve opening communicates with the intake header and the latter with the carburetor an explosion may take place in the header and mixing chamber. There are, however, other causes of backfiring besides those due to a poor mixture.

2—The average stationary steam engine shows about 88 per cent efficiency and the average gas engine about 85 to 90 per cent. These are mechanical efficiencies.

OILER ON OVERLAND FEELS FAST Due to Improper Seating of the Ball Check Valves in the Leads

Schlater, Miss.—Editor Motor Age—I have a 1913 model 69 Overland fitted with an oiler which leaks into the crankcase. This leak is worse when the two front plungers are left up when stopping the motor. When the middle ones are left up it also leaks and leaks but slightly when the two back plungers are left up. I have had the pump taken off and cleaned; the plungers or pistons seem to be worn somewhat so that they do not seem to be tight enough. This leak only developed a short time ago, so far as I know. I have had the car about 1 year. What is the trouble and remedy?—E. H. Schlater.

The leaking in all probability is due to improper seating of the check valves. These valves are in the leads running from the oiler. Disconnect the leads and you will find a small ball check in each one. Remove the ball and the small spring which holds in its place and clean both thoroughly, and at the same time clean the ball seat. Stretch the spring slightly and then replace the parts and the leaking will stop.

Trouble With Metal Polish

Monon, Ind.—Editor Motor Age—Kindly give the best method of cleaning and polishing

nickel parts of a car that have been neglected through the winter and become very dull. Ordinary polishes do not seem to brighten.—H. B. Tull.

Try a strong solution of oxalic acid and if this does not help, a strong solution of sal-ammoniac. These should only be used to remove the dirt and, and after these have been used the polish should take effect.

SPEED OF TWO 1914 TOURING CARS Fiat Is Said to Travel Over 70 Miles Per Hour—Tulsa Made in Oklahoma

Vancouver, B. C.—Editor Motor Age—Why is a four-cylinder car generally used instead of a six-cylinder in racing?

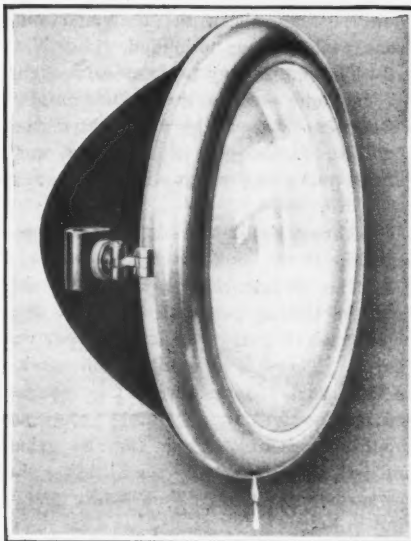
2—Where is the Tulsa made?

3—What is the maximum speed of a Fiat 55-horsepower car?

4—What is the maximum speed of a Norwalk. Have they ever been entered in a notable racing event.—H. A. Scott.

1—No plausible reason can be given except that the fours built for racing have shown results and are not as heavy as the sixes. The Mercedes company builds both fours and sixes and the fours have given a good account of themselves.

2—Tulsa, Oklahoma.



PREVENTING LAMP FROM RUSTING
Tulsa reader drilled hole in rim to permit rain water, which had collected, to run out. The water also caused poor performance of the headlights

3—The agent in Chicago claims over 70 miles per hour for the touring car.

4—Two chassis styles are marketed by the Norwalk six, either one of which will travel over 60 miles per hour, it is claimed. Norwalk cars have not been entered in any notable speed contests.

DIFFERENTIAL GEARS CAUSE HUM Poor Adjustment of Pinion or Out-of-Round, Probable Causes

Marshalltown, Ia.—Editor Motor Age—I have a model 69 Overland in which quite a singing or humming has developed in the differential. This is more pronounced when pulling, than when coasting, or running slowly on level ground. The gears are in perfect condition. Does Motor Age recommend fiber grease in the differential and would it remedy the trouble? The car has been run about 9,000 miles and kept in such shape that otherwise it is as quiet as when new and runs perfectly.—W. G. B.

The cause of the humming may be due to an out-of-round, as it is called. This is

caused by either the driving pinion or differential gear running out of line and although the teeth may appear in good shape, slight inequalities may exist. The backlash between the two gears may be too great or too little. In either case a humming sound will be heard. The out-of-round running may be distinguished by an occasional accentuation of the hum. Thus, in operation, at definite intervals a loud sound will be heard for a moment and then the even or steady hum will be resumed. Motor Age suggests that you permit the Overland Co. to check up the rear end in order to determine the exact cause of the trouble, for although heavy grease would deaden the sound to some extent, as soon as the lubricant thinned sufficiently the noise would again be heard. Differential adjustment is the best method of curing this, and only an expert should attempt the job.

SIGNAL SYSTEM FOR MOTOR ROADS Reader Suggests Checkered Board to Be Placed at Dangerous Places

Norwood Grove, Manitoba—Editor Motor Age—With the Safety First slogan uppermost, it is perhaps the psychological moment for a suggestion which as an enthusiast I have to offer. To me, it is a simple and the logical solution to the much-discussed question of safety signs and signals and ought to meet with approval by the motorist. What I would suggest is a national or even an international danger sign of simple yet striking design to be used at the approach of all railroad crossings, steep hills, bridges, etc.

A sign that would be immediately noticed, even on the darkest night and understood without the necessity of stopping to be read. Thus the Colorado tourist in New York and the Missouri motorist speeding along the California roads at night would be equally familiar with the approach of danger. As to the design itself, nothing can be seen quicker than the checkerboard, such as shown in Fig. 1. The black and white is perhaps preferable, as it is more discernible against the usual background.—S. A. Metcalfe.

Remedy for Rusty Lamps

Walker, Ia.—Editor Motor Age—I discovered that my five electric lamps were rusting, the mirrors were becoming fogged and current shorted, and upon investigation I found that all the front rims were full of water, caused by washing the car and being out in storms. I remedied this by drilling a little hole, as shown in Fig. 2, at the lowest point of the rims so that the water could run out.—A. G. Gary.

Old Tire Within New One

Detroit, Mich.—Editor Motor Age—Referring to Maxwell Smith's scheme, page 35, Motor Age, March 5 issue, of using old casing inside the new ones, does a regular inner tube work all right without any danger of pinching, or must one get a smaller size?—Hind.

Maxwell Smith did not state whether he used smaller tubes or not, but it appears

Questions Answered and Communications Received

G. Sharp.....	Beemer, Neb.
H. J. Goodrich.....	Delhi, N. Y.
A. Subscriber.....	Denver, Colo.
W. E. Fraser.....	Walnut, Ia.
A. Subscriber.....	LeSueur, Minn.
E. H. Schlater.....	Schlater, Miss.
H. B. Tull.....	Monon, Ind.
H. A. Scott.....	Vancouver, B. C.
W. G. B.....	Marshalltown, Ia.
S. A. Metcalfe.....	Norwood Grove, Man.
A. G. Gary.....	Walker, Ia.
Hind.....	Detroit, Mich.
E. G. Dinsdale.....	Glen, Tex.
X. Y. Z.....	Mt. Carmel, Ill.
A. Reader.....	Galve, Ia.
A. Motorist.....	Milwaukee, Wis.
Subscriber.....	Jasper, Mich.
S. A. Fraeger.....	Panola, Ill.
S. A. Carpenter.....	Minneapolis, Minn.
E. A. Avellone.....	Bunceton, Mo.
I. K. Robinson.....	St. Louis, Mo.
	South Haven, Kan.

No communication not signed with the reader's full name and address will be answered.

that pinching may result if the tubes are too large. The tube should be of the proper size to fit the inside tire.

WISCONSIN READER WANTS DATA Motor Dimensions and Other Car Information—Gear Ratio and Prices

Milwaukee, Wis.—Editor Motor Age—What gear ratio has the Detroit?

2—Are cars with long-stroke motors geared lower than cars with short-stroke motors?

3—What bore and stroke has the Jeffery four?

4—What is the bore and stroke, gear ratio, wheelbase and tire size of the Studebaker costing \$775 to \$785?

5—Has it an electric starter?

6—What is the objection to the rough tread on the front wheels?—A Motorist.

1—The gear ratio of the Detroit is 4 to 1.

2—Not necessarily, the normal speed of the motor must be considered.

3—The Jeffery four has a bore of $3\frac{3}{4}$ and a stroke of $5\frac{1}{4}$ inches.

4—The Studebaker four sells for \$1,050 with Westinghouse starting and lighting system. The wheelbase is 108 inches. The bore and stroke measure $3\frac{1}{2}$ by 5 inches. The gear ratio is 4 to 1 and 32 by $3\frac{1}{2}$ -inch tires are used.

5—Yes.

6—There is no objection to rough tread on the front wheels.

RICH MIXTURE STALLS THE MOTOR Float Is Gas-logged or Air Passage Obstructed—Ford Gear Ratios

Glen, Tex.—Editor Motor Age—What is the gear ratio of the 1914 Ford car? What I wish to know is how many times does the motor turn over while the wheel turns over once on both direct and low?

2—Is there any difference in the ratio of the 1914 and 1910 Ford car?

3—I have a model L Schebler carburetor installed in my Ford and at times the mixture is so rich that the motor almost stalls, and speeds up when the air economizer is opened. I may turn the needle valve five or six turns back and screw completely down, but there is no difference in the running of the motor. What is liable to be the trouble?

4—Is there any manufacturer of a worm and sector made to install on a Ford steering gear as to make it irreversible? It seems that this would be something important which would make it easy for the driver.

5—What is the horsepower of the Car-Nation car?

6—Has this car a water or air-cooled motor?

7—Does the American Motors Co. build a four-passenger on the underslung scout?—E. G. Dinsdale.

1—The 1914 Ford car is geared 3.64 to 1 on high and 9.99 to 1 on first.

2—No.

3—If you cannot thin the mixture by turning down the needle valve the float is gas-logged, or the air intake is obstructed.

4—Motor Age knows of no concern making irreversible steering gears especially for Ford cars.

5—The Car-Nation has a 24-horsepower motor, it is claimed.

6—Water-cooled.

7—The American Motor Co. is out of business and did not build a Scout with a four-passenger body.

HOW TO RESET THE TIMING GEARS Small Punch Marks Show Meshing Point—Ford Information

Jasper, Mich.—Editor Motor Age—Is there any method of testing the voltage of a Ford magneto to determine whether or not the ignition is weak, without removing magnets?

2—What is the recommended weight that a 30 by 3-inch and 30 by $3\frac{1}{2}$ -inch tire should

carry? What is the maximum that can be carried without injuring the tire on average country roads?

3—How would a Silent Knight motor with the bore and stroke the same as a Ford compare in weight? If heavier, would it have sufficient power to propel a car not heavier than a Ford?

4—If there was a single-cylinder gas engine with a bore of $3\frac{1}{2}$ by 5 inches with a maximum speed of 600 r. p. m., rated at $1\frac{1}{2}$ horsepower, and a motor car motor of four cylinders with the same bore and stroke and a maximum of 1,800 r. p. m., what proportion of the power would the single-cylinder develop compared with the four-cylinder motor?

5—Kindly give a diagram of the method of timing the valves of a Ford car. If it has been given please refer me to the back number of the Motor Age which contains it.—Motorist.

1—By connecting a voltmeter across the magneto terminals. A special instrument known as the Magnetometer is being marketed by the Hoyt Electrical Instrument Co., Penacook, N. H., which is attached to the dash and tells the condition of the magneto at all times.

2—Not all makes of tires of the same size are designed to carry the same load, for the tire construction has much to do with the capacity. The usual capacity of a 30 by 3-inch tire is 450 pounds in front and 375 pounds in the rear when the car is unloaded. The 30 by $3\frac{1}{2}$ -inch tire should carry 450 in the rear and 550 in front with the car unloaded.

3—The motor may be heavier or lighter, all depends on the man who builds it. There is no reason why a Knight motor of the bore and stroke of the Ford engine cannot pull a car which weighs as much as the Ford.

4—About $\frac{1}{2}$ if the design and workmanship is the same in both cases.

5—The illustration in Fig. 3 shows how the timing gears of the Ford should be in mesh in order to get the proper valve timing. There is a small punch mark on as the illustration shows. The clearance between valve tappet and valve stem should be about $\frac{1}{32}$ inch for the exhaust and slightly less for the intake, both measurements being taken while the engine is hot.

VARIED QUESTIONS FROM ILLINOIS Reader Wants Information on Willys Six—Advantages of Tire Types

Mt. Carmel, Ill.—Editor Motor Age—Did the Wayne Wks., at Richmond, Ind., make the 4 by $4\frac{1}{2}$ -inch motor used on the Willys six?

2—Does the Richmond six use the same motor as the Willys six?

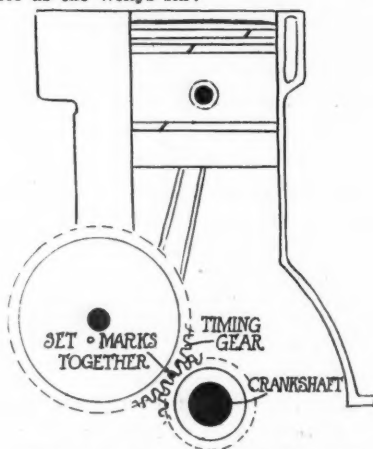


FIG. 3—TIMING A FORD ENGINE
The gears must be so meshed that the small punch marks are opposite as above

3—Who makes the universal joint used on the Willys six?

4—Is the gearbox noise due to worn teeth?

5—Are American annular ball bearings equal to the imported?

6—What is the best steel for rear axles and propeller shafts?

7—Would it be advisable to get a new camshaft for a motor that has been used considerable, to improve the timing?

8—Is the clincher considered superior to the straight side casing?

9—What is the life of a casing in years, when they are used but little?

10—How is the phenomenal speed in the Peugeot accomplished using so low a cylinder displacement?

11—Is a hot-water-jacketed and hot-air-connected carburetor superior in every way to one that is not?

12—How does the Ford accomplish perfect carburetion without either?—X. Y. Z.

1—No. It was made by the Overland company.

2—No.

3—The Hartford Auto Parts Co., Hartford, Conn.

4—Not always. Read the answer to A Reader in Motor Age, issue of April 2, page 33.

5—Some are and some are not, according to engineers.

6—Nickel steel has been found to give excellent results.

7—The question is not quite clear. If you mean you wish to use a shaft with larger cams or cams of different design than the present ones, Motor Age advises that you give up the idea. The valve timing can be altered by resetting the old camshaft and there seems no reason why a new shaft should be installed.

8—There is less chance of rim cutting in a straight side tire and the casing is easier to remove and replace than the clincher. The clincher is as good as the straight side if the motorist is careful. The prices of these types are about the same. The straight side may blow off the rim more easily than the clincher, if the tube has a weak spot.

9—The life of a casing is variable. Some casings have been known to blow out after 100 miles running, while others have lived 10,000 miles, or more than 18 months' running, without giving trouble. The average life is 3,000 miles.

10—The Peugeot racers are built in a number of different sizes and it is not so much the horsepower developed by the motor, which in most cases is low, as it is the utilization of most of that power at the wheels, by cutting down the wind resistance. Cylinder displacement is no indication of speed, as has been demonstrated in past racing meets.

11—The use of hot water and hot air tends to help vaporization, and thus increase the power of the motor and give greater economy, and it is safe to say better results are obtained by the use of heat. Nearly all carburetor manufacturers recommend some heating arrangement.

12—The carburetion in the Ford is by no means perfect.

Flux for Cast Iron

Galva, Ia.—Editor Motor Age—Is there any flux that will make half and half solder stick to cast iron? If so, kindly explain what it is, or how to make it.—A Reader.

A flux which can be used to solder cast iron, is muriatic acid in which zinc has

been dissolved. For tinning, use four parts of sal-ammoniac solution and water and one part hot acid. The action can be improved by sprinkling a little sal-ammoniac on the surface.

LIGHTING SYSTEMS HAVE CUTOUT Battery Automatically Connected and Disconnected at Proper Time

Panola, Ill.—Editor Motor Age—The specifications of the Studebaker Six and Four state, the ignition current is drawn from the generator direct at average running speeds and from the battery at starting and slow speeds. Does this make necessary the constant switching back and forth by the driver as speed changes from fast to slow, or is it taken care of automatically?

2—Is the system of battery ignition as efficient for ordinary touring car work as the high-tension magneto, and should the upkeep expense be any greater than when the high-tension magneto is used? If not, what are the disadvantages?—Subscriber.

1—The switching in of the battery or the disconnection of it is automatically accomplished. The Studebaker uses the Westinghouse system and in this, as in all systems, there is what is called a cutout which automatically disconnects and connects the generator at the proper time.

2—The relative merits and demerits of battery and magneto ignition are discussed in the answer to a subscriber on the first page of the Clearing House, in this issue.

EFFECT OF CARBON IN CYLINDERS Causes Knocking, Overheating, Loss of Power and Misfiring

Minneapolis, Minn.—Editor Motor Age—What is carbon?

2—What harm will carbon do to the motor?

3—Will excessive oil cause quick carbonizing?

4—Give a remedy for removing carbon from the cylinders.

5—Is coal oil a carbon remover?

6—What is meant by high and low-tension coils?

7—How fast can a Mercer runabout run?

8—How fast can a Stutz bearcat run?—S. A. Traeger.

1—Carbon is an element and appears in three forms, diamond, graphite and those other than diamond and graphite or amorphous carbon. Uncrystallized or amorphous carbon, is that which is deposited in the cylinders of motors and is the same in composition as any other carbon but differs in appearance and by its action.

2—Carbon in the cylinders in any quantity causes a loss of power, overheating, misfiring and a general tendency of the motor to labor. The reason for all this is due to pre-ignition. The carbon is not deposited on the piston head and cylinder smoothly, but on the other hand the surface is rough. The small protruding particles become red hot and ignite the incoming gas before the proper time. This causes knocking, misfiring and the other things mentioned above.

3—Yes.

4—The best method is by scraping either with the cylinder removed or in place. The burning out of the substance with oxygen gives fairly good results. Kerosene and denatured alcohol treatments tend to loosen the carbon which is expected to blow out with the exhaust. About 1/4-tumblerful of kerosene is poured into each cylinder at night and the coal oil permitted to remain there for 12 hours. The denatured alcohol is poured into the cyl-

inder when the piston is at the top. The entire combustion chamber should be filled. The alcohol should remain in the cylinder for at least 24 hours.

5—As mentioned above coal oil only loosens the carbon. There is no efficient carbon solvent.

6—High and low-tension coils are other names for the primary and secondary windings of a coil. The words high and low tension mean simply high and low voltage.

7—The company guarantees them to travel 75 miles per hour.

8—The Stutz company does not state but from reports it can travel about 75 miles an hour.

MEANING OF FIXED SPARK IGNITION Density of the Current Increases with Speed of Magneto Armature

Bunceton, Mo.—Editor Motor Age—Is the fixed spark on the Empire model 31 considered adequate on all kinds of roads and pulls?

2—Will it get any hotter than the hand-controlled spark?

3—How is the Empire company financially?

4—Is the Empire an assembled car?—E. A. Carpenter.

1—The fixed spark has been found to give good service under the condition you mention.

2—The fixed spark does not mean that the density of the spark is constant but simply refers to the time of spark occurrence always being at the same point. The spark will vary in density as the speed of the magneto armature increases just as the spark volume becomes greater in the hand controlled system.

3—As far as Motor Age the Empire company is in good financial standing.

4—It is made of standard units.

WESTINGHOUSE WIRING METHOD One-Wire System is Used—Operation of the Starter

South Haven, Kans.—Editor Motor Age—Has a Partin-Palmer motor been tested officially? If so, what horsepower did it develop and at what speed?

2—Which would be most beneficial to a motorcycle engine, so far as cooling is concerned, coasting down a hill with the compression released, or with the compression on, the spark cut out and the throttle wide open?

3—Which is the best lubricating system for a four-cylinder motor?

4—Which is the best, and why, a magnetic or a centrifugal speedometer?

5—Kindly give a wiring diagram of the Westinghouse starting and lighting system.—I. K. Robinson.

1—No.

2—With the compression released and no firing taking place.

3 and 4—This cannot be answered, as the motor design must be considered.

5—The Westinghouse lighting, starting and ignition system wiring diagram is shown in Fig. 4. This is a typical installation and may be slightly different in some makes of cars. The one-wire system is used, which means one side of every circuit is grounded, which is indicated by the letter G in the illustration. When the starting switch is turned, current from the battery runs to the starting motor and thus makes it turn the engine. After the engine has picked up its cycle the generator begins recharging the battery, which is kept properly charged by con-

necting the battery through a reversed, compound field winding. This is known as inherent regulation. The cutout switch, which automatically disconnects the battery from the circuit when the generator voltage is too high, is incorporated in the generator unit.

ADVANTAGES OF 90-DEGREE MOTOR Two Present Makers of This Type—B. T. U. in 1 Horsepower

St. Louis, Mo.—Editor Motor Age—Is it economical and efficient to supply fuel to only one cylinder of a four or six-cylinder engine when starting or when the car is at a standstill, and later supply the remaining cylinders when power is needed?

2—What are the advantages and disadvantages of 90-degree motors? Are these widely used? If not, is it because of an unsuitable carburetor? Would they be more extensively used if supplied with suitable carburetors? Are there any manufacturers of 90-degree motors in the United States?

3—How many B. T. U. are there in 1 horsepower? How much current in volts and amperes make 1 horsepower?—S. Avellone.

1—No.

2—A 90 degree motor is almost perfectly balanced and is cheap to build, but on account of the length of the intake manifold it is a hard motor to start. The chief difficulty with present cyclecar carburetors is the vertical location of the butterfly throttle valve. This, in low throttle position throws the greater part of the mixture to one cylinder. A 90 degree motor is being made by the Metz Motoreycle Co., Waltham, Mass., and the Mack Motor Co., Milwaukee, Wis.

3—One horsepower equal 42 B. T. U. per minute. The watt or unit of electrical power is equal to .00134 horsepower. The watt equals 1 volt times 1 ampere.

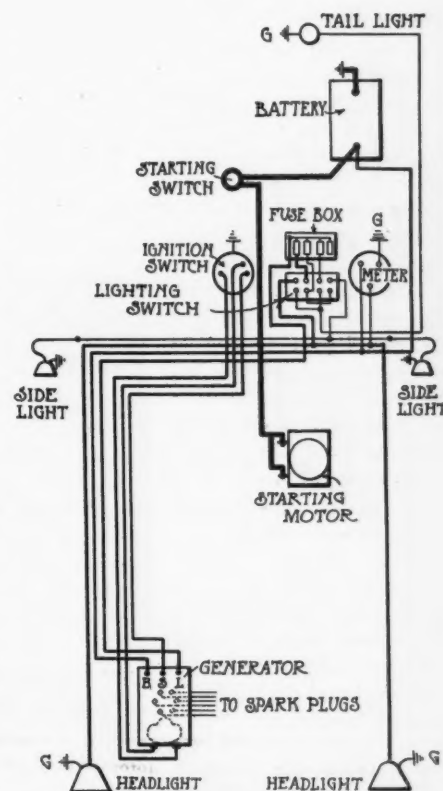
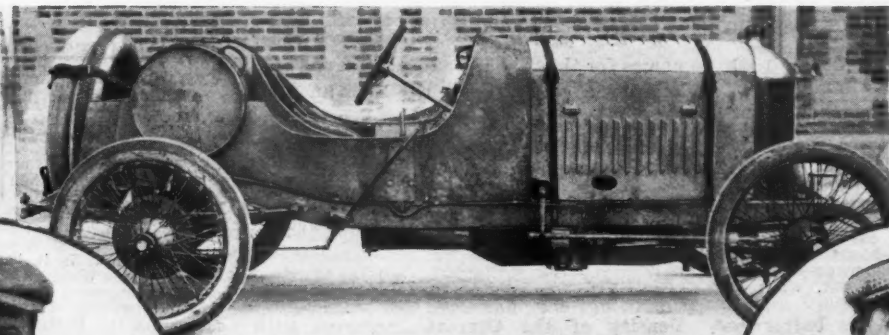


Fig. 4—Wiring diagram of Westinghouse lighting and starting system

Speedy Delages as Tuned Up for the Indianapolis Race

French Maker Tells Details of Construction

AN average of 76.8 miles an hour for nearly 350 miles, and a lap average of 82.5 miles and hour



in four parts, and to get a correct balance with such a shaft was not an easy matter. A certain re-



A. GUYOT, WHO WILL DRIVE DELAGE AT INDIANAPOLIS

constitute Europe's long distance road records. Both records are held by the grand prix Delage cars to be sent to America for the Indianapolis 500-mile race, and were established in the grand prix de France last August, when Delage won first, second and fifth places.

Unique Racing Record

In addition to this record, the Delage machines have another claim to attention: they never have failed to finish their races, and they have gone through all their speed contests without a tool being touched or the bonnet being lifted. Three cars were built; two were entered for the French grand prix, and both went through without a tool being laid on them. The whole three went into the grand prix de France and again covered the full distance without the bonnet being lifted. This latter race was the fastest ever run in Europe.

When the Delage cars were racing in Europe, their mechanical features were jealously guarded. Now that the European rules have been changed and the cars coming to America, the engineers have consented to something like a detailed exploration of the features being undertaken. These machines, like all the Europeans entered for the 500-

The Grand Prix Delage—One of the two entered for the Indianapolis 500-mile race. These cars finished first and second in the grand prix de France last August, running 350 miles at an average of 76.8 miles per hour

mile race to be run at Indianapolis, May 30, were built under a limited fuel consumption rule of practically 14 miles to the gallon. This accounts for the comparatively small cylinder area.

Delage selected four cylinders of 105 by 180 millimeters—4.1 by 7.08 inches—bore and stroke. The cylinders are a block casting, with four valves per cylinder, mounted horizontally. This general design of cylinder and valve location had been employed 2 years previously when Delage won the French 3-liter race.

A feature of this motor is the use of ball bearings throughout, in order to secure the highest mechanical efficiency. The crankshaft is carried in five robust M. & B. ball bearings; there are five ball bearings for the camshafts, ball bearings are also used for the auxiliaries, pump and magneto shafts. The use of a five-ball-bearing crankshaft entailed certain difficulties, for it necessitated a built-up shaft



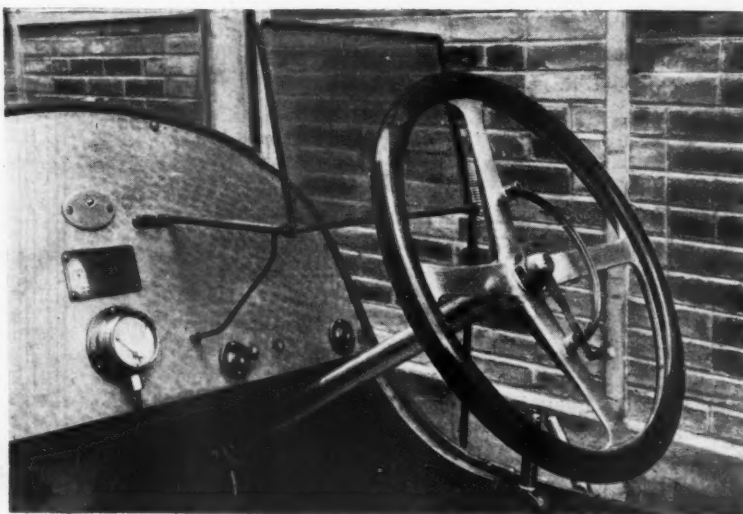
RENE THOMAS, WHO WILL DRIVE DELAGE AT INDIANAPOLIS

serve is maintained regarding the details of the shaft, for this feature of the design is being incorporated in the 1914 car.

Crankshaft Is Hollow

The crankshaft is hollow, as also are the camshafts. In order to give the greatest possible rigidity to the motor, while securing lightness, a girder is carried under each main bearing. This girder is of H-section and of BND steel. Around each ball race there is a kind of cage which forms an important function in connection with lubrication.

As can be seen from the illustrations, there are four valves per cylinder. These are mounted horizontally and have a diameter of 30 millimeters and a lift of 9 millimeters. The valve operation is by vertical pushrod and a bell crank, each one having two arms and operating a pair of valves. Lightness has been obtained in these parts, the valve tappets being hollow and only 1 millimeter thick, and the vertical pushrods also being hollow and of the same thickness. The exhaust is brought out at an angle of practically 45 degrees, there being a separate pipe from each valve port into the long exhaust pipe carried to the rear along the left-hand side of the car. Valve timing is not exaggerated, the ex-



Aluminum dash cowl and individual windshield for the driver—two of the features of the Delage cars entered for the 500-mile race. The only wood in the cars is in the steering wheels

haust opening having a lead of 45 degrees and the intake closing a lag of 20 degrees. The motor develops 120 horsepower at 1,850 revolutions.

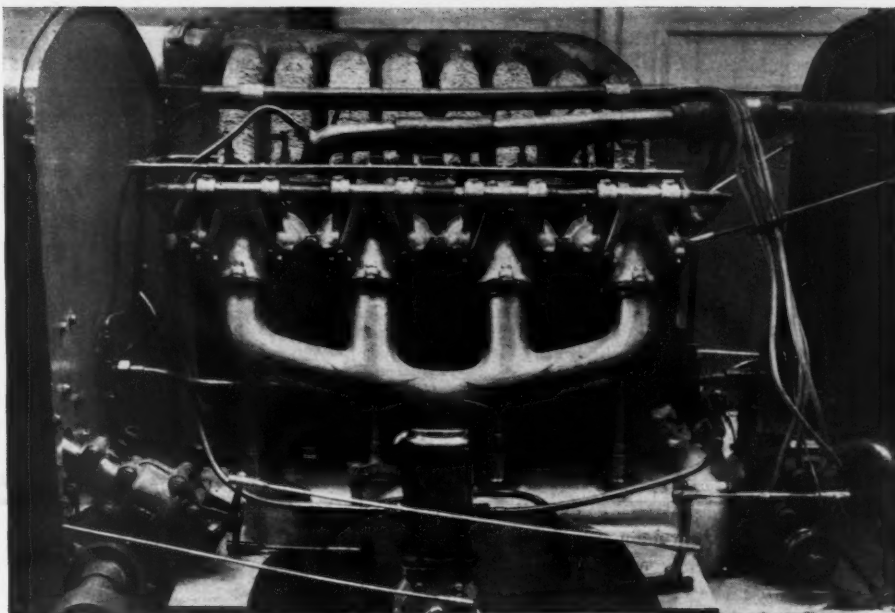
BND steel is made use of extensively in the motor. It is employed for the crankshaft, connecting rods, and valve gear. Steel pistons are used with two rings, having bayonet-type joints. The pistons are drilled, the central portion is of smaller diameter than the top and bottom, and oil grooves are provided. Connecting rods are hollow and are machined conically. There is a cylinder offset of 25 millimeters.

Two independent magnetos are fitted, one of these is driven off the cross shaft operating the water pump, and the other is set fore and aft on the exhaust side of the motor. The eight plugs are mounted in the head of the cylinders, but as far apart as possible. Each magneto has its own switch, mounted on the dashboard, thus enabling the driver to cut out either magneto for purposes of testing. While the failure of either magneto would not stop the running of the car, it is found that much better results are obtained with the two magnetos firing simultaneously.

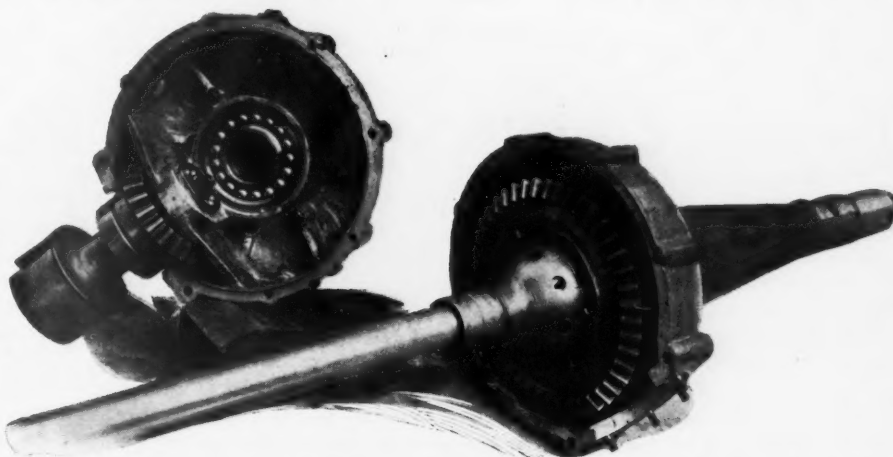
Lubrication Interesting

Lubrication is an interesting feature. A gear pump in the base chamber is driven off the intake camshaft. It delivers oil through a collector to the main bearings. In this collector there is a hand-regulated valve and three leads, one to the main bearings, one to the overhead valve gear, and one to the dashboard pressure indicator. With the valve closed the whole of the oil goes to the main bearings and none to the overhead valve gear, the pressure on the indicator thus attaining its maximum.

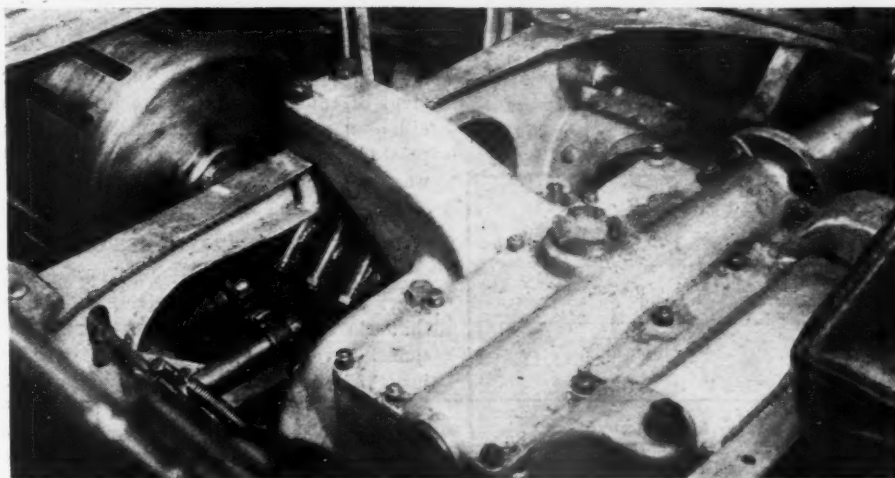
The valve always is kept open a certain amount, allowing a quantity of oil to escape to the valve gear; the pressure indicated on the dash indicator is the actual pressure delivered to the bearings. As already mentioned, there is a cage around each ball bearing. This insures



Intake side of the Delage racers. The eight intake valves are operated by bell cranks on a single transverse rod above them, which in turn is worked by a single push rod at the front of the motor. The separate exhaust pipes from each of the eight exhaust valves can be seen merging into the exhaust header in the background. There are sixteen valves in the four-cylinder engine. There are two magnetos, one of which is seen in the illustration. Both are driven from the same cross shaft at the front of the motor



Rear axle and differential of the Delage. The axle tubes are conical in shape and are machined out of the solid forging. The differential housing is aluminum and steel, designed for low weight and great strength. The driving pinion is carried in ball bearings at front and rear. Drive shafts are hollow. The weight of the whole rear end comprising the complete axle, the rear universal and the brake drums is only 170 pounds



The five-speed gearset of the Delage racers. The first speed really is an emergency gear and, like the reverse, is kept covered by a clip on the gate. The housing is aluminum

a constant bath of oil for each bearing, and also enables the bearing to drive out the lubricant centrifugally into collectors delivering it to the connecting rod ends and to the camshafts and piston walls.

System a Centrifugal One

The system can be described as a centrifugal one, the function of the pump being limited to keeping a supply of oil in the housings around each main bearing. The overflow from the collector is carried up to the axis of the bell cranks. All these are united by flexible tubes, the shafts of course being hollow, and a complete circuit is maintained in the two sets for respectively exhaust and intake valves. From this lead for the valve gear, there is a return to the base chamber by way of the timing gears. In addition to the oil in the base chamber there is a supple-

mentary tank on the dashboard with a feed to the motor. The flow from this tank is regulated according to conditions under which the motor is running, and is made sufficient to maintain the correct level in the base chamber. To prevent an excess, through inattention or any other cause, there is an overflow on the side of the chamber, the superfluous oil being lost on the road. This arrangement makes practically impossible a fouling of the plugs through excess lubrication.

Mounting of the Motor

In all their French races these cars have been fitted with Claudel carbureters and Bosch magnetos. Rigid mounting is adopted for the motor, which is placed directly on the main frame members. The gearbox, however, has three-point suspension to a couple of transverse frame members. The connection between the two is by multiple-disk clutch. Designed for road racing the cars have five speeds and reverse, but the first speed really is an emergency gear and like the reverse is kept covered by a clip on the gate. While the housing is of aluminum, the whole of the interior of the box is of BND steel, the shafts are hollow and are carried on M & B ball bearings.

One of the most interesting features of this set of cars, and one in which the

fine workmanship is most apparent, is the rear axle. The material used is BND steel with aluminum for the differential housing. The conical axle tubes are machined out of the solid forging and have a thickness varying from 3 to 4 millimeters. They are bolted to the central housing, and the two halves of this are in turn bolted together around their circumference.

The differential housing is a fine piece of work, designed with a view to minimum weight and maximum strength. It is deeply ribbed where it receives the bolts attaching it to the axle tubes, and has a vertical wall in which is carried the rear bearing of the drive shaft. The driving pinion is thus carried in ball bearings front and rear. The drive shafts are hollow, the differential satellites are bevel type. By reason of the use of high-grade material and correct design it has been possible to get the weight of the complete rear axle to the unusually low figure of 170 pounds. In this weight is comprised the axle complete, the rear universal joint, and the brake drums. This low, unsprung weight is responsible, in a very large degree, for the remarkable manner in which the cars hold to the road at high speed. Broad semi-elliptical springs, carried above the axle, are relied

upon to take the drive, the propeller shaft in consequence having two universal joints.

Total weight of the car, with tanks empty, is 1,900 pounds. This low weight has been obtained by the use of the highest grade material in every part. This applies to such parts as brake and change-speed levers, change-speed gate, brake rods and levers, etc., where dimensions are reduced to what, in standard car practice, appears like flimsiness, and would indeed be such, if special steels had not been employed. Aluminum figures very largely in the make-up of the car. It is used for the bonnet, scuttle dash, seats, floor boards, dash boards.

Changes for Indianapolis

For participation in the Indianapolis race the cars have undergone few changes. Gear ratio has been modified to suit track conditions, the latest type of Rudge-Whitworth wire wheels have been adopted, and one of the cars at least will carry a streamline tail. In European racing circles the Delages are looked upon as the fastest of the foreign contingent. Certainly the cars are among the finest examples of racing productions in the old world, and their appearance against the cream of America assures for Indianapolis a race altogether unequalled in intensity.

Burman Predicts Great Speed for His Racing Cars

Driver Using Wisconsin Motor of His Own Design

BOB BURMAN is building two cars at Battle Creek, Mich., to make their first appearance at the Indianapolis speedway Memorial day. One of these is to be driven by Burman himself, and the other probably by Billy Knipper. Both cars are to be called the Burman and have four-cylinder motors of Burman's own design, made by the Wisconsin Engine Co. It is understood that the design is strictly European, being a result of ideas picked up in the recent trip to Europe of E. A. Moross and Burman.

Very little of the details are obtainable at this time, although it is known that the piston displacement will be just under the speedway limit, being 449.9 cubic inches. The valves are in the head of the cylinders and are operated by an overhead camshaft.

According to Burman the engine shows 130 horsepower at 2,400 revolutions per minute, which would give the car a speed of 120 miles per hour on the speedway. At 1,600 r. p. m., which engine speed Burman expects to maintain at the speedway, the car will travel 102 miles per hour. No details as to the equipment have been given out as yet, except that there will be eight shock absorbers and Nassau tires will be used. The first of the cars has been finished and now is on the road.

MAINE HOLDS ROAD CONVENTION

Bangor, Me., April 11—Maine's first good roads convention was held in Bangor on Wednesday and Thursday of this week and was attended by the majority of the prominent men identified with highway

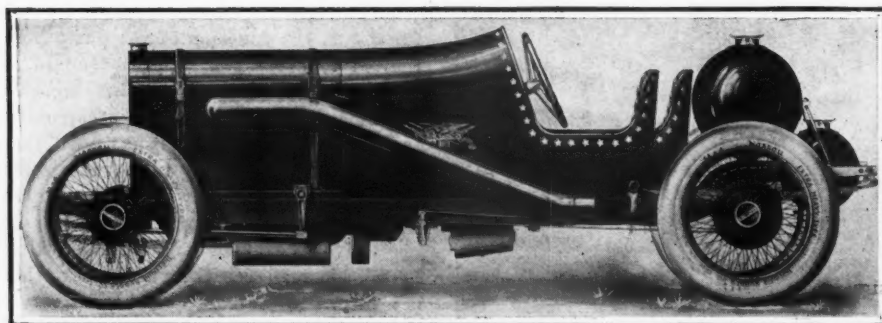
construction throughout New England and by a representatives of the federal government. Governor William T. Haines attended the convention and welcomed the delegates to Maine.

C. S. Stetson, master of the state grange, spoke on highways from the point of view of the farmer and Professor George T. Files of Bowdoin College talked on improved roads. S. Percy Hooker, state superintendent of the New Hampshire highways, presented some data on the good roads movement in his state as did Colonel William D. Schier, superintendent of the Massachusetts highway commission.

Colonel Schier told how Massachusetts had aided the small towns in the improvement of contingent highways by the state aid plan and said that \$150,000 is appropriated for this work where only \$75,000 was given formerly.

CITY NOT RESPONSIBLE

Milwaukee, Wis., April 10.—The circuit court at Milwaukee has given a decision that the municipality is not legally responsible for damages by reason of the injury of a pedestrian caused by a municipally-owned motor car, even if the driver of the car is at the time performing public duties. The driver is thus held to be responsible to defend any suits arising out of such injury.



SIDE VIEW OF BOB BURMAN'S NEW RACING CAR

Herff-Brooks Has Lowest-Price Six on the Market

Car Sells for \$1,375 With Equipment

TWO cars, a six and a four, the former, at present the lowest-priced six-cylinder car on the market, comprise the line of the Herff-Brooks Corp., Indianapolis, Ind. In outward appearance the six and the four are very much the same, and the only difference structurally lies in the motor.

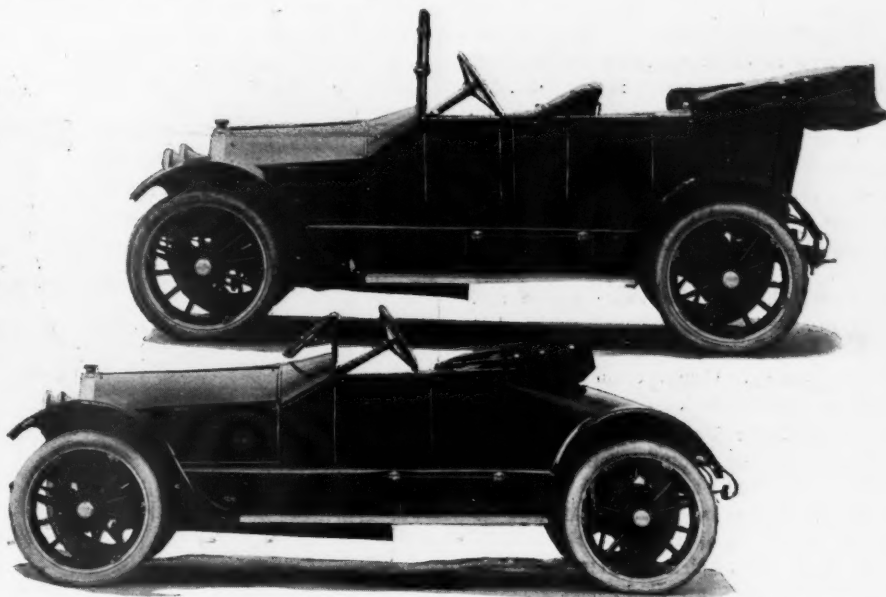
At \$1,375 the Herff-Brooks six is sold with complete equipment, including Jesco cranking and lighting system, top, windshield, quick-acting curtains, speedometer, dimming attachment for the headlights and the regular appurtenances usually offered with a five-passenger touring car. The body is of clean design with a graceful sloping cowl, as may be seen from the illustrations herewith. Right drive and center control is being used and all the instruments set on a cowl board.

Motor Details of the Six

The six has an engine with separately cast cylinders of L-head construction, individual valve inclosures being used to conceal valve tappet noise. The bore and stroke of this motor is 4 by 4½ inches. The cooling is by pump circulation with the pump in an unusual position in front of the timing gear case and directly behind it on a crankcase platform is a Kingston magneto. The carbureter, also of Kingston make, is on the same side. A feature of the motor is the accessibility of these units and the ease with which they may be removed. The right side of the engine is clear, except for a water pipe to the radiator and a breather for the crankcase. Lubrication is by splash-pressure in which the oil is taken by a gear pump, from a sump in the crankcase, passed through a strainer and then sent to a dash sight feed, from whence it travels to individual troughs under the connecting rods, which have spoons on their caps.

The single camshaft runs on three plain bearings and controls square pushrods operating in similar-shaped guides. The pushrod ends are adjustable and operate the valves which are of 1½ inches diameter and have ⅝-inch lift. The normal motor compression with these valves is 65 pounds per square inch. Seven plain bearings support the crankshaft, the brasses being of 1¼ inch diameter, while the rod bearings are 1¼ inch in diameter. The gears in the timing gear case operating the auxiliary shafts are cut helically. Four point motor suspension is used, the crankcase from which the supporting arms project being made of semi-steel.

Leaving the motor, the drive is transmitted to a leather-faced inverted-cone clutch with spring inserts, this clutch being so designed, as to include in its action a brake, for preventing clutch spinning when changing from one speed to another. Amidships, is found a three-speed selective gearset whose shafts operate on



The upper illustration shows the Herff-Brooks four touring car, which has a block-cast motor, and below is shown the six-cylinder roadster, which has separately cast cylinders

FEATURES OF HERFF-BROOKS CARS

Jesco starting and lighting system

Six has separately cast cylinders

Four has a block motor

Seven-bearing crankshaft on six

Separate cases for quieting valves

Clean design of body

ball bearings, the main shaft being splined. A single universal is used in the transmission of the power to the rear axle, which is of the semi-floating type, the drive shaft operating it, being inclosed in a tube.

The two sets of brakes used are of the internal expanding type. The Jesco motor-generator is carried on a plate on one side of the gearset case and is driven by silent chain from a gear bolted to the clutch sleeve. The battery for this system is in the rear under the body and in such a position that when the rear floor boards are removed the accumulator may be inspected.

The Four-Cylinder Model

The Herff-Brooks four motor is of 4½ by 5 inches bore and stroke and is block cast, the cylinders being of L-head construction, as in the six. The same equipment as to carbureter and magneto is used on the four and only in minor points of design does it differ from the six. The pushrod guides, for example, are held in place in pairs by clamps, while in the six this practice is not used.

The running gear of the four is the same design as in the six, but smaller in proportion. This car with all equipment is listed at \$1,100.

MONOGRAPH ON ALCOHOL

Washington, D. C., April 12—Germany now uses between 40 and 50 million gallons of denatured alcohol a year, of which over 30 million gallons are sold to the general public for burning purposes. The importance of this fuel in Germany may be appreciated when it is considered that France uses about 18 million gallons, the United States about 10 million gallons, and the United Kingdom only 4 million gallons, according to a monograph by Charles A. Crampton, commercial agent of the department of commerce, recently issued by the bureau of foreign and domestic commerce. Denatured alcohol is not only gaining in favor for general burning purposes, but a determined effort is being made to find a way of using it as a motor fuel in place of the high-priced gasoline. All the recent developments are dealt with in the new monograph, which is entitled "Production and Use of Denatured Alcohol in Principal Countries," special agents' series No. 77. Copies at 5 cents each may be had from the superintendent of documents, government printing office, Washington, D. C.

GERMANY'S CAR STRENGTH

Washington, D. C., April 12—Some interesting statistics have recently been furnished the department of Commerce; the statistics showing that on January 1, 1913, there was in the German empire a total of 49,760 passenger cars, and 7,581 motor trucks, totaling 57,341 vehicles.

Bradley Motor Has Single Water-Cooled Rotary Valve

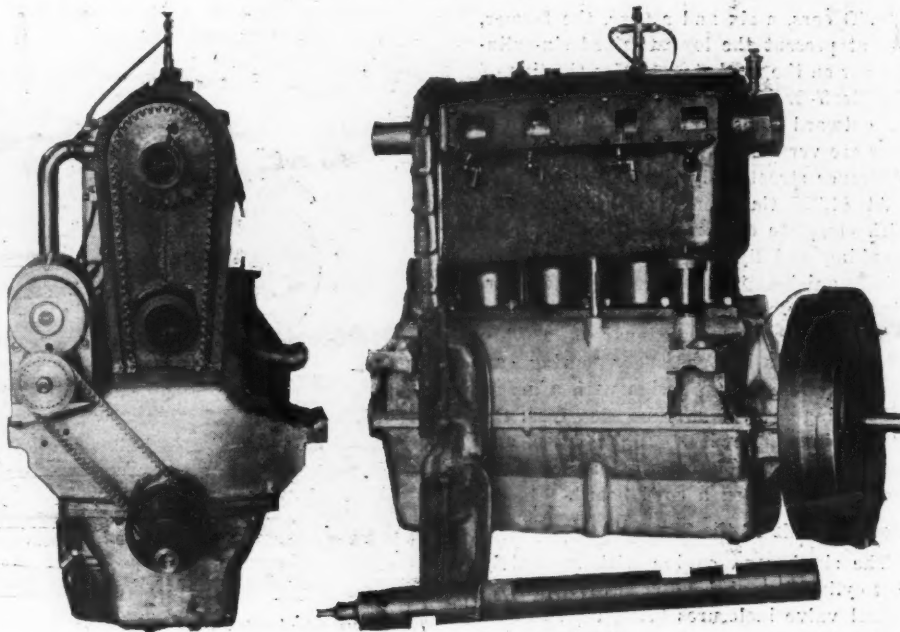
Flexibly Coupled to the Radiator

A NEW rotary-valve motor is announced which has many unique features and is different from the type in use on the Speedwell rotary six, in that one valve takes care of both intake and exhaust, and that valve has water circulating through it. The motor is called the Bradley and has just been brought out by the Bradley Motor Co., Harvey, Ill., in both four and six-cylinder models. In general the two motors are the same, that is, the valve action and parts are of the same construction, but there are points of difference which relate to the cooling. Construction below the valve is conventional.

One-piece Valve Used

In the Bradley motor a single rotary valve is mounted on top of the cylinder casting directly in the middle and is driven by silent chain from the crankshaft gear, an adjustment means being provided to take up chain slack. The valve is in one piece and is flexibly coupled at both ends to the water pipes leading to and from the radiator. The illustration of the section on this page shows the valve water jackets and the various other water compartments used.

In the four-cylinder motor, which has a bore and stroke of $4\frac{1}{8}$ by $5\frac{1}{2}$ inches, the cooling is by the thermo-syphon system, but in the six, which is $3\frac{3}{4}$ by $5\frac{1}{2}$ inches bore and stroke, a pump is installed. In both cases the construction is such that while the motor is running hot water circulates through the jackets, including the valve, but when the motor stops the water drops to a level below the valve, so that there is no possibility of any water making its way between the valve and its seat to the combustion chamber. Besides keeping the temperature of



TWO VIEWS OF THE BRADLEY MOTOR

At the left is shown the silent chain drive of the valve which is placed on top of the cylinder casting and the lighting and ignition generator. The block cast motor with the valve removed is shown at the right.

the valve the same as the cylinder casting, the metal is annealed a few times to prevent any chance of seizing. The valve and its seat are oiled directly by leads from an oil pump and at present .001 clearance is allowed for the oil film.

The valve ports are $1\frac{1}{4}$ by $1\frac{1}{4}$ inches. There are four ports in the four-cylinder engine, each cut taking care of both intake and exhaust and in this way the valve is given additional cooling after the exhaust, by the passage of fresh gas through the port. Dr. C. M. Bradley, the designer of the motor, states the entire valve may be replaced for \$4.50 so that in the event that a valve is worn excessively, a new one would cost about the same as the grinding of poppet valves.

Valve Timing Figures

The valve is so placed that the inlet port is in communication with the manifold at 13 degrees of crank angle after top dead center, and closes 5 degrees beyond bottom dead center. The exhaust opens 20 degrees before bottom center and closes 10 degrees after top dead center. The cylinders, pistons, etc., are oiled by splash, the feeding system being somewhat novel. There are four troughs into which spoons on the rod ends dip. These troughs are so arranged that when the car is ascending or descending a grade each cylinder gets an almost equal portion of oil. The walls of the troughs are of unequal height, so that in ascending the oil is pocketed in one trough while the oil in the adjacent one is overflowing. This means that the splash from one trough is made to supply two cylinders

for the time the ascent or descent is being made.

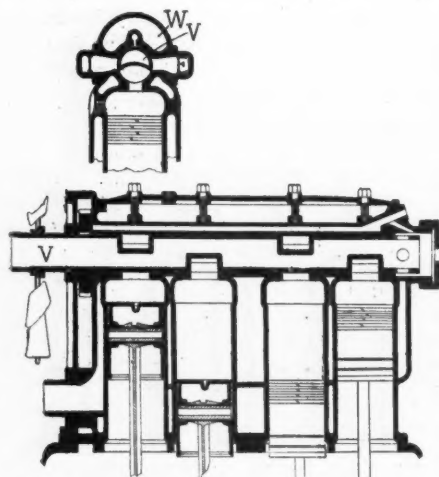
The first Bradley motor which was built some time ago has been run for 1,000 hours and then disassembled and it was found the valve did not wear perceptibly. There was, however, a slight cut in the metal, due to a piece of dirt rubbing on the valve seat. The motor is being tested daily in a chassis for pulling power and slow running under load and from the reports of the designer the results are excellent. The present equipment consists of a National lighting and ignition generator and a Rayfield carburetor, but this has not been decided upon definitely.

SPHINX TO BE YORK-MADE

Detroit, Mich., April 12—York, Pa., is to be the location of the Sphinx Motor Car Co., which has been formed by H. R. Averill, for 7 years sales manager of the Pullman Motor Car Co., and which is backed by interests in eastern Pennsylvania and Baltimore, Md., in addition to Mr. Averill.

The first car is being manufactured in this city and reveals striking lines and constructional features for a light car. It is conventional in every respect, however. It is designed to sell between \$600 and \$700 fully equipped. The motor is a 3% by 5 block type of the L-head design and is cooled by thermo-syphon. It is said to develop 30 horsepower.

The axles are Weston-Mott and the gear-set is located on the rear member and affords three forward speeds. The drive shaft is inclosed within a torque tube,



SECTIONS OF THE NEW BRADLEY

The upper view shows the waterjacket W above the valve and the jacket V which is in the valve itself. The lower illustration shows the position of the valve in the casting and the coupling at the right.

while cantilever springs support the pressed steel frame front and rear. A brand new feature in motor car construction is the location of the change gear lever and the emergency brake lever on brackets attached to the front end of the torsion tube. This is done instead of having a separate cross piece to carry these levers.

Other specifications of the Sphinx are wire wheels, worm-and-sector steering gear, 110-inch wheelbase, 10½-inch clearance and standard tread. Two body styles are contemplated, a roadster and a five-passenger type. The bodies run flush-sided down to the frame, thereby eliminating

any aprons from running boards to body. The gasoline tank is to be in the cowl, and another advantageous constructional feature is that the entire body is hung on four brackets, which are attached to the frame members. Thus, on the removal of four bolts, the body may be removed entirely from the chassis. The five-passenger car weighs under 1,800 pounds when equipped. Remy electric equipment is to be used.

Mr. Averill states that about 1,000 cars are planned for the rest of the present year, but in another year production will be stepped-up in accordance with the demand.

Savage Motor Built for Small Cars No Radical Construction Used

WITH new small cars, light cars and cyclecars being brought out each week, it is to be expected that motor makers busy themselves in developing and building motors particularly suited to the needs of these cars. A number of manufacturers announced motors recently and the latest to come forward is the Savage Mfg. Co., Chicago, which has just brought out a four-cylinder L-head, blockcast engine of 3 by 4 inches bore and stroke.

Nothing radical in the way of design has been used and not until a number of motors were built and tested did the maker decide upon a definite design. The motor, as it is to be made and marketed in quantities, has the cylinders and the upper half of the crankcase a unit, with the crankshaft supported on the upper crankcase half, so that the lower acts only as an oil reservoir. The entire motor is about 25 inches long overall and slightly more in height.

The Savage is thermo-syphon cooled and oiled by splash. Troughs under the connecting rods are kept filled with oil by the action of a small pump driven by an

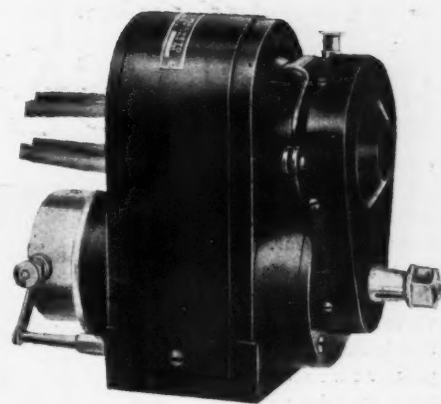
eccentric on the camshaft. The overflow from the troughs drops to a sump, from which it is taken by the pump, being strained before being used.

The pistons show nothing unusual, except that they are not equipped with ordinary rings, but use the Leak-Proof type made by the McQuay Norris Co. Two rings are used per piston. The connecting rods weigh slightly over 1 pound.

Three plain bearings support the crankshaft, all being 1½ inches diameter. The end bearing is 3 inches long, making for rigid support. The motor is to use helical timing gears, although the first few turned out used spurs. At present a Mayer carbureter is used and facilities offered for the installation of Atwater Kent or standard magneto ignition.

BERLING SMALL-CAR MAGNETO

The Eriesson Mfg. Co., Buffalo, N. Y., is manufacturing a high-tension magneto called the Berling, designed for four-cylinder motors and is particularly adapted to engines with high crankshaft speed, such as the small-car engines now being



Berling high-tension magneto which has many features which make it particularly suited for four-cylinder high speed motors

brought out. The two-cylinder Berling magneto, another product of this concern, was described in Motor Age previously.

The features of the four-cylinder type are simplicity, its small size, accessibility, low price, and when these are supplemented by the waterproof and dirtproof features, the Berling becomes a desirable ignition machine for motor car engines, according to the maker. The illustration herewith of the new Berling gives one a general idea of its simplicity, which is carried out in the inner parts also.

Known as the type N, this instrument incorporates both primary and secondary winding, no outside coil being necessary. The distributor wires are led through the magnet arches and the securing of these wires at the magneto end is said to be rigid enough to prevent any possible chance of loosening. It is stated by the maker that a 3-16-inch spark is obtained at a speed of 75 r. p. m. There is but .005 inch clearance between the armature and the field.

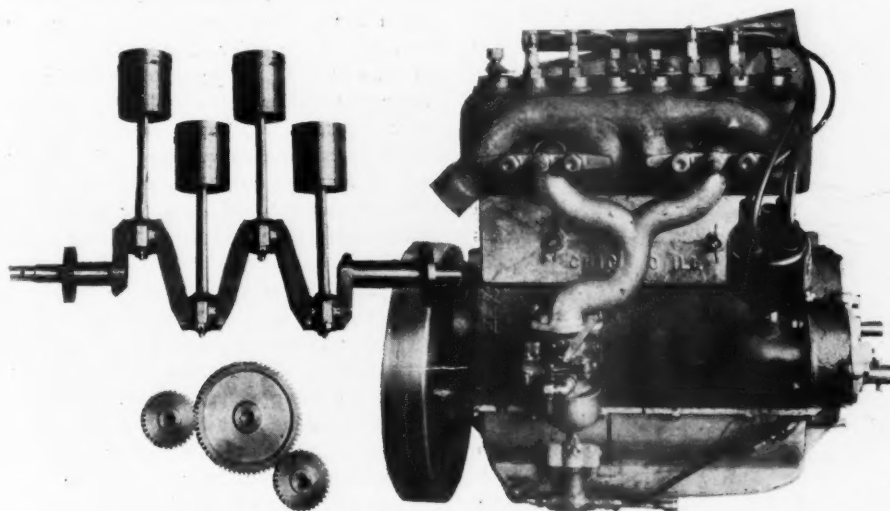
The interrupter cams are integral with the interrupter housing, so that loosening of these cams is eliminated. Ease of adjustment is another feature. The distributor can be removed easily, it is stated, for cleaning purposes.

IOWA REGISTERS 65,000 CARS

Des Moines, Ia., April 12.—Iowa cars have passed the 60,000 mark in the registration at the state house and the state treasurer now has over half a million dollars on hand in the motor fund for the year. Of the money now on hand the sum of \$80,550 will go to the state highway commission while the rest will be distributed among the ninety-nine counties of the state.

SHOW WEEK FOR BROOKLYN

Brooklyn, N. Y., April 12—While Brooklyn will not have a show this year, there will be a gala week among the local dealers, the last week in April, and all the show rooms will be decorated and have displays. The matter was settled definitely recently at a meeting of the Brooklyn Motor Vehicle Dealers' Association.



THE SAVAGE A NEW SMALL-CAR MOTOR

Can be fitted with either Atwater Kent ignition system or with any standard type of magneto. At present a Mayer carbureter is standard. The crankshaft, pistons with leak-proof rings, and the timing gears are shown at the left



The Realm of The Commercial Car

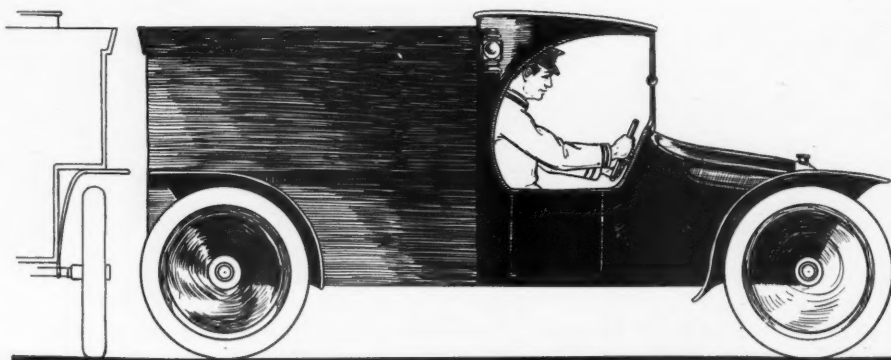


THE parcelcar is of necessity a different vehicle from a cyclecar. It runs more hours a day, it carries more varied and diversified loads, it cannot pick routes but must travel on any street, and it must be arranged in body and seating for many stops and quick get-away.

The average cyclecar is not fitted to this work any more than a touring car is fitted for trucking. For light work, such as laundry and clothing store quick delivery, for dry goods stores covering small territory and those firms whose loads need not average over 200 pounds the cyclecar will stand up, provided the machinery be foolproof enough to be handled by the average delivery boy. Ordinarily, however, the parcelcar is a separate business car designed and built for business and sold by a different kind of salesman from the cyclecar type.

Comparison of Work

In checking up parcel delivery the writer has made trips on nearly every kind of delivery vehicle used in Chicago for this work, from the 6-ton truck to the 1,000-pound gas car and the 1,500-pound electric. These trips have been checked with a stop watch and the time of delivery taken, the miles per package, the packages per mile, the speed per mile, the time per package, the duplication of route, the standing time, the running time, and tabulation made of these items in comparison of cars and districts. These trips have brought out the very important



For distance work the accessibility of packages is not so important. In this case driving ability is more to be sought

Parcelcar Possibilities of the Cyclecar

item of time saved at stops, this being perhaps the most important of all.

Where the Horse Excels

A 2-ton truck making twelve stops per mile will not make as good time as a horse outfit in the same work if the driver has to get out and go to the rear to get the package every time he stops. Even then the truck is beaten, because to equal horse cost it must do twice the distance or tonnage delivery work. A 1,000-pound motor truck costs twice the amount per day, on the average, that a horse outfit of the same capacity costs to operate, and hence, to pay, must cover twice the mileage. If the stops are near together the motor truck has no advantage over the horse, for a horse can start and go a block and stop as quickly as a motor truck, and the time to deliver the package to the house will be the same in both cases. Thus at present the motor truck has not and will not touch this field of delivery in congested territory in a really efficient manner. The stops are too frequent and the standing time per day too long for profit to show under this system.

Into this field the parcelcar will fit. This should be a simple car, as is the cyclecar. It should be no more costly than a one-horse delivery outfit and no more costly to run. Such cars can be built and made reliable and foolproof. They

need not be fast, and a single-cylinder water-cooled motor of the motorcycle type will be powerful and efficient enough for the load. Water cooling makes the car more foolproof, and hence, probably, is advisable for the class that would handle the vehicles. The body and general layout should be made to fit the conditions.

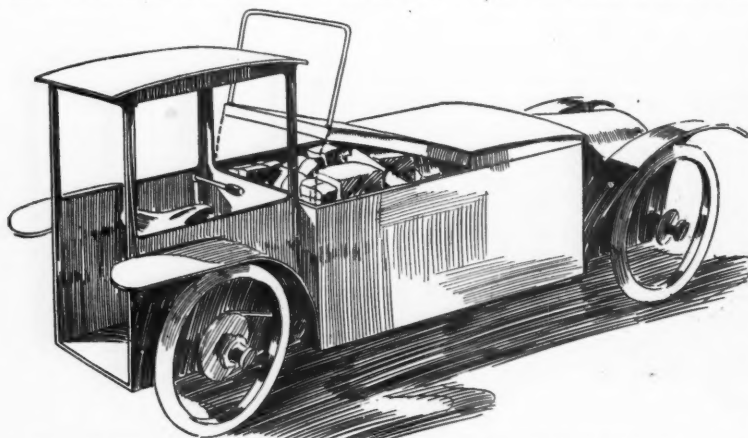
If package delivery with many stops per mile—routes where horses are now used—a cyclecar would save no time over the horse vehicle unless able to get up to speed quickly, and to stop quickly. By the time the vehicle stopped the driver would want to be on his way with the package in his hand, without having to stop the car first, climb out over a high side, walk to the rear, take off his mittens—for these cars run winter and summer—take out his keys and unlock rear doors, and then fumble around to find a package out of place. This would take 2 minutes per stop extra, limiting the stops in 4 hours per day standing time to fifty packages, for from 2 to 3 minutes is taken per stop in delivering the bundle after the driver is on his way. This is the average figure for flat and apartment districts.

Saving Valuable Time

Fifty packages per day is not enough per car, in city work at least, which is the type of delivery we are discussing, and the parcelcar therefore must have provision for getting the package from the seat, and in the order of the route, so that no time is lost. In perfected electric delivery the writer has noted some of this work whereby, having a ratchet on the brake pedal, the driver was off the car and on his way to the apartment before the car was stopped, this car making a remarkable delivery showing for the day's work.

A parcelcar of cyclecar type will not hold as much as a one-horse wagon, but can cover more territory, and with correct handling, should make more trips per day in an enlarged sales area. Even at that the running cost is below that of a horse outfit, so that if it does as much as a horse and wagon, it is earning a dividend and anything beyond that is velvet.

Another package field for stores covering big territory, but having light loads, would be that type where but one stop per mile is made, or even a stop every 2



Suggested type of parcelcar for delivery work in congested districts with many stops per mile. The packages can be reached from the seat by raising the door and windshield combination. The driver is well protected from the weather, and can drop off the car quickly by sliding back off the saddle, as shown

or more miles. In this case the car should have more speed and will not need the quick pick-up or starting of the city delivery car. The gain in this work will be on road speed, not package speed.

For example: Take a horse outfit covering 15 miles in two trips a day and delivering 400 pounds of merchandise in 20 stops. A parcelcar of 200-pound capacity could do this same work in less time, for the twenty stops would take, at 4 minutes apiece, but 1 hour and 20 minutes, leaving 4½ hours for running and 2 for loading—a big figure. In the 4½ hours the parcelcar runs it should cover at least 45 miles, thus showing a profit over the horse of 15 miles a day at the same cost, for 30 miles with 200 pounds equals the horse's 15 miles with 400 pounds. Fifteen miles is a day's work for a horse in this work.

Planning a System

In planning a parcelcar a number of things should be kept in mind. First, the handiness of the bundles. These should be easily reached from the seat. The packages should be in sight of the driver if possible, and yet nothing should hinder the driver's vision forward. Wind resistance on the car should be kept down by low weight and narrow tread, while the cyclecar's narrow tread will enable the vehicle to follow paths in the country and go to places where a motor truck could not deliver.

On a trip by truck out of Milwaukee the writer remembers a delivery made to a house ½ mile off the road in the suburbs. The road was too bad for the motor truck to attempt, so a boy made the ½ mile walk while the truck waited. With a cyclecar the cinder path at the side could have been taken and the equivalent of 4 miles of running saved.

The drawings show several arrangements possible for the parcelcar for congested city work. For trips with few stops per mile ordinary body types will do.

Drivers Must Be Hustlers

One drawing shows a type with a narrow seat at the rear. This seat is arranged so that after setting the hand brake the driver, having reached forward and taken his package from the bin, can slide off the rear and be on his way while the car stops. The power would of course be disconnected and the car nearly at a standstill before he dismounted. A form of lever starter would be used for turning the engine over when he got back, in case the motor had been stopped, but with water-cooling this would not ordinarily be necessary.

The parcelcar field probably will not receive the attention it deserves until the pleasure end of the cyclecar movement is finished, as sales cost is less, but there is a real and profitable future in this line.

The sales proposition should be studied carefully, and if rightly handled, could bring a profit very quickly.

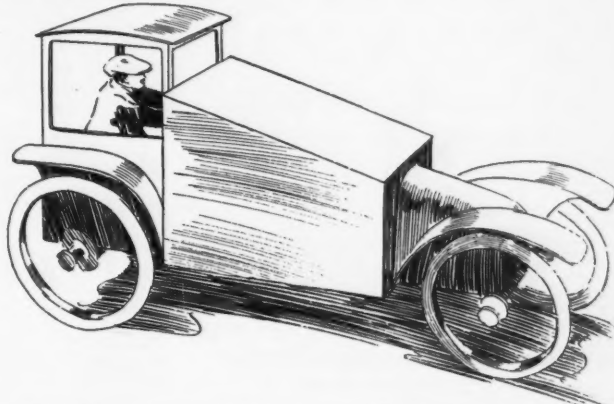
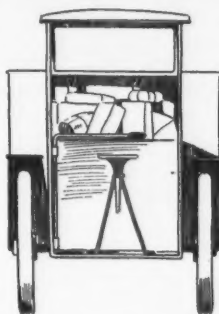
French All-Drive Tractor Test Results

Big Machines Put in Hard Hill-Climb

THIRTEEN all-drive tractors left the city of Rheims, France, for a 600-mile test over the hills and rough roads along the eastern frontier, and thirteen tractors with their two trailers each have reported at Paris in apparently excellent condition.

This test is regarded in France as the most severe to which motor vehicles ever have been subjected. It is the first time motor vehicles have been made to operate on hilly country and over dirt roads in

ter. It happened on several occasions that a trailer would become embedded in the soft mud by the road side and hold up all those in the rear. As no tractor ever gave help to its companion, it happened on more than one occasion that the leaders would check in before night and the tail-enders would not report home until 6 or 8 o'clock the next morning. This delay was in no way caused by mechanical difficulties.



Parcelcar without raising lid. The bundles are reached from the seat by the opening shown. The windshield is small and the floor very low, well adapted to parcel post work

France in mid-winter. So severe was the test that drivers were kept on duty for periods of 24 and 36 hours.

Makes All-Drive Tractors Popular

As the result of these trials there will be a large increase in the number of four-wheel drive tractors employed in the French army, and particularly in the artillery corps. The superior officers already were so convinced of the utility of these vehicles that they had placed big orders, but they lacked accurate data on the range of usefulness under war conditions when the roads and the country are in their heaviest possible condition. Unlike motor trucks, artillery tractors rarely have the privilege of traveling over well-made roads. The necessity of securing commanding positions makes it imperative that they should be capable of traveling across country anywhere a horse team can move a load, and even where it cannot.

This competition was decidedly remarkable by reason of the lack of mechanical defects and breakdown. A few repairs had to be carried out, but they were always of such a nature that they could be attended to by the crew, and it never was because of mechanical defects that the machines failed to report in on schedule time.

More criticism can be levied against the committee responsible for the trials than against the tractors taking part in them. It was shown that it was a mistake to send a series of trains, each one consisting of three vehicles and weighing from 14 to 22 tons, over dirt roads so narrow that passing was a difficult mat-

It should be noted that outside help never was secured on any occasion. Wagons weighing 7½ tons would become embedded in mud until their frame members were touching the ground; the tractor itself sank until its mechanical organs were touching Mother Earth, but in every case they were got clear under their own power. All the material necessary for getting free was carried on the vehicles. The quantity was unnecessarily large, but this being the first contest of its kind a considerable amount of experiment had to be indulged in, and much of the material would be eliminated from future competitions.

Hill-Climb Ordered

On returning to Paris it was decided by the military jury to carry out a series of supplementary tests dealing with hill-climbing ability, the use of winches and capstans, brakes, and the power of operating across country with thick mud prevailing. The first tests were the climbing of a gradient of 11 per cent with a pronounced S turn in the middle. Tractors had to get half way up with two trailers, then unhitch the trailers for a brake test, and finally haul the trailers to the top by means of the capstan. The results of the trailer brake test were uniformly unsatisfactory. When the 15-ton loads were left to themselves it was impossible to hold them on the hill with their own brakes. These brakes were of the ordinary horse-wagon type, brought into contact with the steel rim of the wheel by a screw or by a lever. In every case the diameter of the shoes was too small.

The Accessory Corner

Absolute Locknut

A LOCKNUT which may be tightened by the hand but which cannot be turned even with a wrench, except when a nail, or wire of sufficient size, is inserted in a recess provided, is announced by the American Lock Nut Co., Chicago, Ill. This locknut, called the Absolute, depends for its action upon a pin held in place in a recess in the nut. The pin, with its securing device shown in Fig. 2 as A, is easily removable. The locking pin is of such size that when the nut is screwed onto the bolt, the angled sides of the pin heads fit into the threads of the bolt, as shown in the illustration. Any backward motion of the nut tends to bind the pin more and more against the bolt threads.

Tulite Bulb

The Tulite Auto Bulb Co., Detroit, Mich., is marketing a lighting bulb for motor car lamps, which contains two distinct filament, one giving low, and the other high candlepower light, hence the name Tulite. The country filament gives 20 candlepower and the filament to be used in the city gives 4. The wiring of the bulbs is simple and instructions are given by the maker so that any owner may install them.

Jones Car Lock

The Jones Auto Lock Co., Tacoma, Wash., is marketing an unusual form of motor car theft-preventer, the device consisting of a means of locking the intake manifold against the passage of mixture. The lock is combination-controlled from the dash of the car. The installation of the Jones lock requires the use of a special intake manifold which incorporates the mechanism. The combination may be operated in the dark, for it is by a series of clicks that the operator knows how far to turn to the left or right. The installation of the Jones is shown in Fig. 5.

Maburn Tester

A small dash instrument which is used to short circuit the ignition of each cylinder of a motor in order to ascertain which is misfiring, is announced by the Mapes & Burns Mfg. Co., Rochester, N. Y., under the name of Maburn tester.

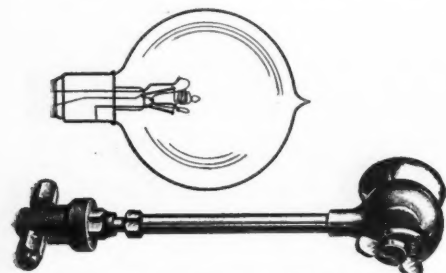


FIG. 1—TWO USEFUL ACCESSORIES
Upper illustration is a two-filament lamp called the Tulite. Lower illustration shows the Gasolock theft preventer



FIG. 2—ABSOLUTE LOCKNUT
The small pin A wedges into the bolt threads and the nut cannot be loosened unless a nail is forced into the hole to push the pin aside

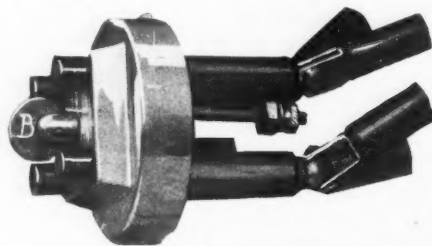


FIG. 3—MABURN IGNITION TESTER
This instrument is placed on the dash and is used to short circuit the ignition to any or all cylinders to ascertain which is misfiring

This device, shown in Fig. 3, consists of leads to the cylinders terminating in a switch which has a releasing key B in the center. Should the car be traveling 20 miles an hour and the motor misfire a turn of the key B releases the buttons which, when pressed, short circuit their respective cylinders. Thus, if no difference is noted in the motors operation when No. 1 button is pressed, then No. 1 cylinder is misfiring. The device is easily installed from the directions given by the maker. It sells for \$5 for the four-cylinder type and \$8.50 for the six, both with polished brass finish.

Portable Electric Saw Table

Garage men and body makers will be interested in a portable electric saw table brought out by F. W. Lieberknecht & Co., Brookline, Mass., which is designed for wood cutting and is operated by a small motor as shown in Fig. 9. A special chute takes care of all sawdust. The whole table weighs 60 pounds and is 12 by 16 inches long and 12 inches high. The saw supplied is 6 inches in diameter. The motor supplied is either for alternating or direct current, as desired.

Gasolock Theft Preventer

The Headlight Support Co., Detroit, Mich., is making a device for shutting off and locking the fuel supply, which is held to even eliminate the need of theft insurance. This device shown in Fig. 1,

is known as the Gasolock and is operated from the seat. By turning a thumb button the supply of gasoline to the carburetor is shut off and locked with a Yale lock until the holder of the key releases the mechanism. No two of these locks are alike. The manufacturer points out that the Gasolock presents several other practical features. It prevents the waste of fuel due to a flooding carburetor, and in the event of the latter igniting, due to a backfire, the supply of fuel can be immediately shut off, preventing severe loss.

The installation into the gasoline pipe line is said to be easy. This accessory has the advantage of being not only adaptable to the first car on which it is installed, but may be used again on any other machine. Two Yale keys are supplied with each lock and a third is kept by the Headlight Support Co., being filed away with the owner's number, so that in case both of the owner's keys are lost, a wire or a

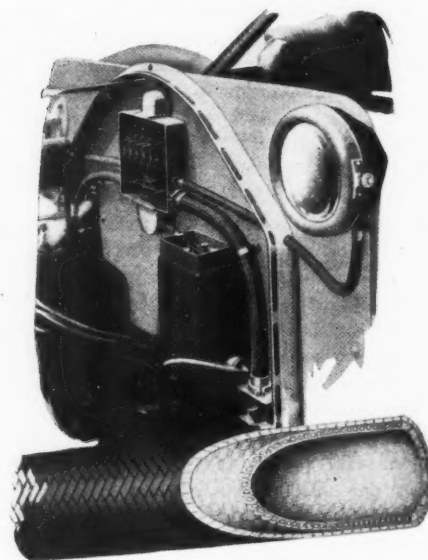


FIG. 4—AUTOFLEX TUBING INSTALLATION

This material is used to house the lighting and ignition wires as shown above and protects them against water, dirt and short circuit

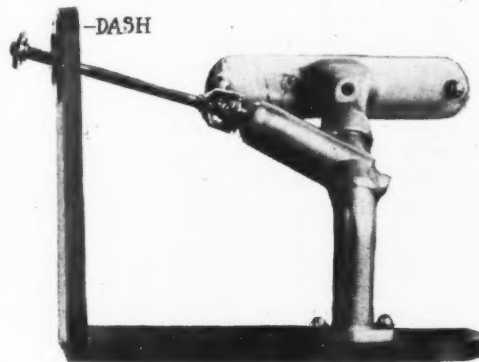


FIG. 5—JONES CAR LOCK
An unusual form of theft preventer which locks the intake manifold against the passage of gas

letter will bring the extra key without charge and by special delivery mail.

Kamp Air Accelerator

Feeding additional air to the motor as the speed increases is accomplished in an unusual way in the Kamp accelerator manufactured by the B. H. Kamp Mfg. Co., Mt. Carmel, Ill. This device is in the form of two priming cups A screwed into the intake manifold as shown in Fig. 6, and operated by a handle on the dash of the car. As the car speed increases the handle is turned and cups opened admitting more air to the intake manifold directly. The entire outfit sells for \$5.

Ferguson Gas attachment

The Gibson Distributing Co., New Haven, Conn., is marketing the Ferguson gas attachment by means of which oil lamps are converted so that they may use acetylene gas. This attachment appears as a hollow rod to which the gas line is attached, and the end of which is fitted with a burner. A small clamping device is fastened at the burner end so that the attachment may be clamped to the oil burner. The Ferguson device installed in an oil lamp is shown in Fig. 8. The price is \$2.25 for a set of three.

Servus Headlight Dimmer

A simple attachment which makes it possible to throttle the flow of current to the bulbs of the headlights is announced by the Servus Equipment Co., Newark, N. J., under the name of Servus electric dimmer. The Servus is in the form of a

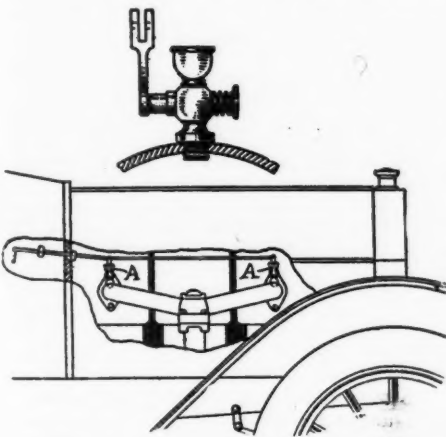


FIG. 6—KAMP AIR ACCELERATOR

A device which feeds additional air to the intake manifold through petcocks controlled by a handle on the dash

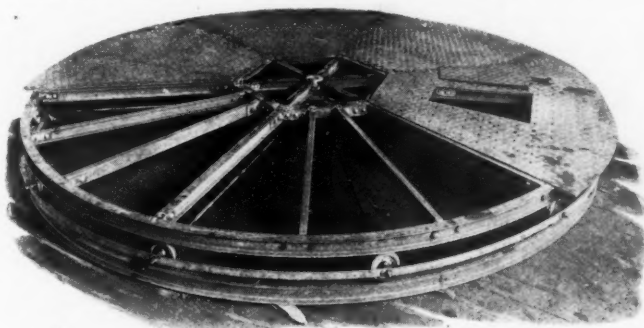


FIG. 7—AMERICAN BRIDGE CO.'S TURNTABLE

Made for both public and private garage use and rolls on twelve cast iron wheels

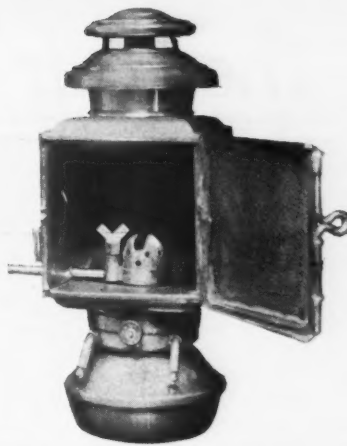


FIG. 8—FERGUSON GAS ATTACHMENT

By the use of this simple device an oil lamp may be converted so that it will handle acetylene. The burner easily is attached

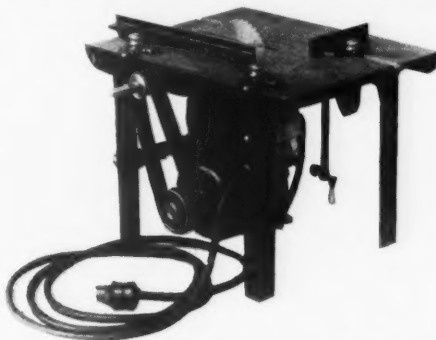


FIG. 9—PORTABLE ELECTRIC SAW TABLE

The saw is 6 inches in diameter and is operated by a small motor placed underneath

combined rheostat and switch, the resistance unit being divided into ten sections, with contact points so arranged as to allow all, any part, or none of the resistance to be thrown into the circuit. The controlling device is shown in Fig. 10 in the form of a circular switch, making contact with ten buttons or terminals. It is sold for \$5.

Autoflex Tubing for Wires

The National Metal Moulding Co., Pittsburgh, Pa., is marketing a tubing called Autoflex, which is designed especially for the housing of lighting and ignition wires used on motor cars. This material is made up from semi-flexible fiber cord coiled into the form of a helix and tightly interwoven with tough thread to form a flexible tube which is treated with a moistureproof compound.

An outer covering of tough yarn is braided over this tube and the completed material then impregnated with compounds expressly designed to withstand the conditions met with in service.

The use of this material protects the wires and hinders the possibility of a short circuit, it is claimed, and at the same time

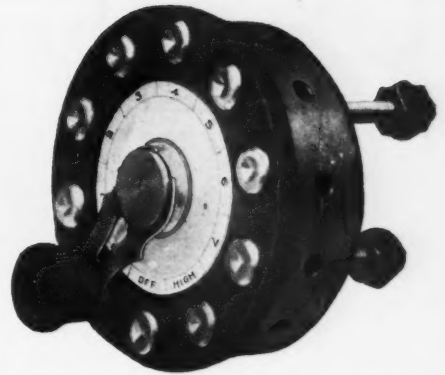


FIG. 10—SERVUS HEADLIGHT DIMMER

Throttles the flow of current to the headlight bulbs and makes it possible to procure any candlepower from 0 to the maximum

makes the wiring installation simple, as may be seen in the illustration in Fig. 4. The concern is marketing also switch and fuse boxes, one type of which is shown in the same illustration. The tubing sells for from 5½ cents per foot for the 7-32 inch size to 18 cents per foot for the 3-4 inch intermediate sizes in proportion.

American Bridge Co.'s Turntable

The Minneapolis, Minn., branch of the American Bridge Co. is manufacturing a turntable for both private and public garages, the table consisting of a steel frame of 3-inch I-beam section, carrying ¼-inch steel plates. The table rolls on twelve cast iron wheels carried on a spider with spacing bars. The top plates of the table are punched with holes so that it may be used also as a wash rack. One of the plates has a loose section which may be lifted so that oiling and inspection underneath is easily accomplished. Two sizes are being made, the 14-foot selling at \$250 and the 15-foot at \$275.

Noglare Headlight Glass

The Corning Glass Works, Corning, N. Y., is marketing special glass for headlights which is said to effectively remove all glare and give high penetrating power in fog, smoke or dust. A pale yellow light is produced by the use of Corning glass. Noglare lenses may be applied to any headlight and come in round beveled disks ¼ inch thick, but special glasses may also be obtained.

Blac-Namel for Metal Parts

The Atlas Auto Supply Co., Chicago, is marketing a substance called Blac-Namel, a paint which may be used on brass parts to give them a black glossy appearance. The enamel dries quickly and makes the parts appear as if the enamel has been baked on. Blac-Namel is sold in cans at 75 cents.

The Atlas company is marketing also Preserve tire paint, which is claimed to protect the casing against moisture and oil and at the same time give it the appearance of a new tire. A pint can sells for 50 cents.



From the Four Winds



CLEVELAND Club Increases Capital Stock—To care for increased membership the capital stock of the Cleveland Automobile Club has been increased from \$10,000 to \$30,000. The enrollment may now be increased to 3,000. Nearly 2,000 now are members.

Club Gains 137 Members in March—The Automobile Club of St. Louis during the month of March gained 137 new members, making the total membership of the organization, which pays robbery insurance and repairs roads in the St. Louis district, 2,098. The club is attempting to enroll 2,500 members before the fiscal year closes, which is an average of sixteen new members each day.

License Fees to Total \$500,000—According to a recent report of J. A. Shearer, Ohio registrar of motor cars, more than a half million dollars will be realized in 1914 from registration fees. Up to April 1, the total receipts were \$325,000. The total number of motor cars registered up to that date was 59,250, for which fees amounting to \$306,707 were collected. The total receipts for 1913 were \$457,537.55.

Yosemite Valley Open About June 1—The latest report from the Automobile Club of Southern California is that the Yosemite Valley will not be open to motorists before June 1 and that the Mount Wilson road will not be open for 2 months, extensive repairs and added safety stations and turnouts being installed throughout its entire length. The Owens Valley road, known as the Pasear route, is now in better condition than ever before.

Bungalow for Kansas City Club—A new club house to cost \$10,000 will be built by the Automobile Club of Kansas City on its 40-acre tract near Hickman's Mills, 5 miles south of Kansas City, Mo. The structure will be of bungalow type with cafe and sleeping rooms for members. The construction will be completed as quickly as possible. The club has just taken possession of its new downtown quarters at 1020 McGee street, a four-story brick building with garage storage space for 300 cars and repair equipment. The club previously had rooms in the Midland building.

Kansas City Boosting Good Roads—The organization of a Kansas City Good Roads Club is now under way. It is proposed to effect it through a coöperation of special committees from all the civic organizations, maintaining headquarters in the new rooms of the Automobile Club of Kansas City. A fund for the completion of nearby road projects and the advertisement of Kansas City as a tourists' city will be raised by the organization. It is being furthered by E. E. Peake, secretary of the Kansas City Motor Car Dealers' Association, and Judge E. W. Shannon, chairman of the good roads committee of the motor club.

Wolverines Schedule Boost Tour—One of the most extensive trade-producing motor tours ever attempted will be the motorcade that will travel from Menominee, Mich., to Milwaukee and Chicago in July. The Association of Cloverland Commercial Clubs, an organization of business managers of trade-boosting societies in the upper peninsula of Michigan, which has been designated "Cloverland" in all advertising, has assurances from 500 representative citizens that they will join in the tour, and not less than 100 motor cars will be provided for the accommodation of the crowd. The route will follow the west shore of Lake Michigan to Chicago and return and the advantages of

living and trading in Cloverland will be exploited at every point in novel ways. The plan was evolved by Colonel Charles W. Mott, secretary of the Upper Michigan Advancement Association, who is a Milwaukee man.

Bats 1,000 in Stolen Car League—C. M. Tucker, motor vehicle officer of Wichita, Kan., bears the record of having recovered every machine stolen in Wichita during the last 15 months. There are 1,400 motor cars in the city.

Gas Price Again Cut—Last week saw another cut in the price of gasoline in St. Louis, the Standard Oil Co. of Indiana reducing the cost of the fluid from 13½ cents per gallon to 13 cents. It was the fifth cut in the price of the fluid since the Indiana concern returned to do business "on its good behavior," November 4 last, when gasoline was selling for 17½ cents a gallon.

Burlington Club Holds Election—I. G. Wheeler was elected president of the Burlington Automobile Club of Burlington, Wis., at the annual meeting. Hugh Agner was elected vice-president; William Reine-man, secretary, and A. Zwiebel, treasurer. The principal work of the club is for highway improvement and the organization has succeeded in making boulevards out of poor dirt roads throughout western Racine county.

Steps on Throttle; Robbers Flee—August Prange, a garage man and dealer at Sheboygan, Wis., has developed a new method of escaping hold-ups while traveling on lonely country roads. One night last week Mr. Prange was stopped by three highway-men and ordered to deliver his valuables. Instead of obeying, he put his gear in first speed, stepped on the throttle and brushed the robbers aside. The men were so taken by surprise that they took to their heels and ran away.

Crookston Has Progressive Club—The Crookston Automobile Club of Crookston, Minn., has cleaned up an indebtedness of \$1,300, graveled 6 miles of road and induced commissioners to gravel 20 miles more at an expenditure of \$3,000 in all since the last annual meeting. The club has \$2,000 worth of road machinery, including a gas tractor. The following officers for 1914 have been elected: President, Dr. A. G. Morley; vice-president, E. O. Hagen; treasurer, I. B. Fisher; secretary, C. M. Lumpkin; governors, W. R. Low, Ed Peterson, Sam Rosenthal, B. D. Keck, W. T. Carlisle. The club appointed a committee to submit to other clubs a plan to restore the old Pembina trail, which will make one of the finest motoring highways in the northwest.

Sentence for Joy-Riding Bug—The heaviest penalty ever meted out in Wisconsin for the crime of using a car without the consent of the owner was the sentence of 6 months in the house of correction imposed on Richard Henn, aged 24, of Milwaukee, in municipal court last week. Henn took the car of Dr. Frank J. Gaenslen, Milwaukee, from in front of his office and was captured several hours afterward with the car in his possession. The fact that Henn had previously been convicted seven times for similar offences induced the judge to impose a heavy penalty. Money fines or suspension of sentences have been the rule in such cases heretofore. Henn is a hospital attendant and has a mania for borrowing cars, in each case taking the car of a physi-

cian for his nocturnal joy-rides. He was convicted under the Wisconsin statute of 1911 which was framed by the motoring organizations to make car-stealing commensurate with horse-stealing, the maximum penalty for which has been 15 years in state prison.

Lincoln Road Link to be Paved—All roads voted upon in Willis township, Laporte county, Indiana, at a recent election were carried by good majorities. This means that about 5 miles of the Lincoln highway east of Laporte will be covered with macadam. The county commissioners will ask for bids on the construction in a short time and it is expected the roads will be completed before the summer is over.

Boost Roads with Brass Band—Bands have been brought into service in Ohio for the purpose of boosting the good roads cause. Recently a delegation of good roads enthusiasts from Auglaize, Mercer, Logan and Union counties appeared in Columbus, headed by a brass band. They came on a special train, 200 strong, to urge the governor and highway commission to start the improvement of a main market road through Celina, Wapakoneta, Bellefontaine and Marysville during the present summer. The governor has advised the state highway commission to get busy.

Concrete Roads for Wisconsin—Concrete highway construction in Milwaukee county, Wis., for 1914 will average \$16,500 per mile, according to the contracts thus far made with contractors for approximately 20 miles of 18-foot roadway. The price of \$16,500 per mile does not, however, include the cost of the cement, which is purchased in large lots by the county direct and furnished to contractors. Bids are taken for furnishing all labor and material except cement, which is furnished delivered on the road, for certain specified roads. The county also furnishes the water supply and lays water-pipe lines of a temporary nature as the work progresses. Good roads enthusiasts say that the cost of concrete highways, especially the Milwaukee county figures for 1914, are well below their most conservative estimates and point out that concrete construction costs little more than other materials so far as first cost is concerned, with the further advantage of long life, making the last cost far below that of macadam, gravel or even asphalt.

To Popularize "Year 'Round Route"—The Gulf and Intercoastal Highway Association was organized at a meeting held at Lake Charles, La., on April 8. Further details of the organization will be perfected at a meeting to be held in New Orleans some time during the summer. About 150 delegates were present and much interest was manifested in the proposed improvement. Officers were elected as follows: President, Joseph O. Schwartz, New Orleans; general vice-president, Walter Gex, Bay St. Louis, Miss.; state vice-presidents—California, Rufas Choate, San Diego; Arizona, Charles Rawlings, Globe; New Mexico, Frances E. Lester, Las Cruces; Texas, James Rooney, Fort Stockton; Louisiana, Marshall Ballard, New Orleans; Mississippi, J. B. Drives, Gulfport; Alabama, John Craft, Mobile; Georgia, John Temple Graves, Atlanta; South Carolina, E. J. Watson, Columbia; North Carolina, J. Hyde Pratt, Chapel Hill; Virginia, Preston Belvin, Richmond; secretary, John B. Kent, Lake Charles; treasurer, John Legler, Jr., New Orleans. The association adopted the slogan, "Year 'Round Route." The route of the proposed highway is from

New York City to San Diego, Cal., via Salisbury, N. C., Atlanta, Birmingham, Montgomery, Mobile, New Orleans, Lake Charles, Beaumont, Houston, San Antonio, Fort Stockton, El Paso, Las Cruces, Globe and Imperial Valley.

Repairing Flood-Damaged Roads—The first money to be spent on highways in California under the new law will be for repairs to damage done by the recent storms. The total of the \$18,000,000 voted in state highway bonds now disposed of is upwards of \$10,000,000 despite the fact that the 4 per cent bonds have not sold at par since October 1912.

Heavy Fines for Intoxicated Drivers—In Los Angeles a new ordinance provides in cases of conviction for driving a motor car while intoxicated a minimum fine of \$50 for the first offense and imprisonment in the city jail from 10 to 180 days for a second offense within 1 year. The state law provides for the revocation of the operator's license where the holder proves to be an unsafe driver.

Road Race on Texas Highway—Plans are being formulated by the Texas division of the Southern National Highway Association for road races to be held in Reeves county the third week in August in connection with the meeting of the Texas division of the association at Fort Stockton, Texas, at that time. It is planned to run the races on a section of the Southern National highway in Reeves county. The distance across the county is approximately 75 miles, but the length of the course has not yet been determined. The course is to be improved and made first class in every respect. Every county in Texas that has voted on a bond issue for road improvement, whether the election was carried or lost, is eligible to enter at least one car in the races. The promoters have assurance already of a large number of entries.

Motorists to Patrol Streets—Under a plan evolved by the Milwaukee public safety commission, a voluntary organization of citizens to aid in the prevention of all kinds of accidents, street traffic and particularly motor car traffic will be much improved in Milwaukee this year. One hundred motorists who have been proved law-abiding and careful drivers will be selected to do patrol duty. Each member of the special committee will carry an insignia on his car in the form of a disc containing the letters "T. P.," which stand for "Traffic Protection." They will be expected to report violations of the law to the police department, which will take such action as the circumstances warrant. The insignia will be placed on the radiator cap and another on the rear license plate of the cars driven by members of the patrol squad.

Convict Road Labor Economical—Road building by convicts has stood the test of the scientific investigation made for Columbia University, through its graduate highway department, by Sidney Wilmot, a road engineer and an advanced student in that university and attached to the staff of the national committee on prison labor, which also is located at the university. The findings of the investigation show that the work performed by the convicts in the different states ranges in value from \$1.50 to \$5.70 per day, with a profit to the state by the use of this labor of from 50c to \$4.03 per day. An interesting feature of the study is the comparison of the cost of subsistence and of guarding. The average cost of subsistence is found to be 40c per man per day; while the expenditure for guarding in those cases where costs could be secured averaged 48 2-5 cents. A striking thing of these figures is that the expense of guarding adds to the cost of the work over 20 per cent more than that



NEW COUNTRY CLUB HOUSE OF THE HOOSIER MOTOR CLUB, NORTHEAST OF INDIANAPOLIS

of feeding. This throws into prominence the economic advantage of the honor system. This substitution of a man's word and his conscience for a gun was, at the first, a makeshift, but has since become a necessity—a saving in every sense of the word.

Motor Car Serves as Alimony—Giving the wife the family car in lieu of alimony is the precedent established by Judge E. B. Belden of the circuit court at Kenosha, Wis., last week. Mrs. Bertha Newman, wife of a farmer, sued for divorce and in granting the decree Judge Belden ordered: "Let the wife be given the custody of the child and the motor car." No further arrangement for the payment of alimony was ordered.

Hoosiers Schedule Several Runs—A number of runs are to be made during the next few weeks by the Hoosier Motor Club of Indianapolis. The program of runs will be added to from time to time, so that there will be a week-end run almost every week during the summer. The schedule thus far arranged is as follows: April 26, to Flat Rock Cave and return; May 3, run around city and then to country club house for lunch; May 10; campfire lunch at Cartersburg Springs; June 6 and 7, run to French Lick and return; June 13 and 14, run to Dayton, O., and return; June 20 and 21, run to Fort Wayne and return; June 28, run to Lafayette, returning via Mudlavia Springs and Crawfordsville; July 4 and 5, run to Lake Maxinkuckee and return; July 12, run to Newcastle and return. The new country club house at Crows Nest, northeast of the city, will be opened with a dinner, dance and reception on May 1.

Good Roads Meeting at Tulsa—Nearly every department of the state government has pledged its support and assistance in making the Ozark Trails good roads convention to be held at Tulsa, Okla., May 26 and 27, a success. Delegates from every county of the state will be appointed by the governor, the state board of agriculture, the state superintendent of public instruction, and the state highway commissioner to the convention. These appointees will receive personal letters from the Ozark Trails Association. The association operates in Missouri, Arkansas, Kansas and Oklahoma and delegates are expected at the meeting from all four states, including the four governors, who have expressed their intention of being present if possible. A delegation of forty men from Tulsa at-

tended the United States Good Roads Association meeting in St. Louis in November and they were successful in bringing the next session of that organization to Tulsa, which will meet some time in September.

Traction Company to Run Garage—The Wilmington and Philadelphia Traction Co., in addition to operating a street railway system in Wilmington, Del., as well as one in Chester, Pa., and connecting lines, and also a local telephone system, has gone into the electric garage business. A large steel building, for many years used as the main electric light and power station of the company and which is now used only for boosting the current and distributing it in the heart of the city, is being converted into a garage, where it is proposed to store and charge electric cars—trucks principally.

Cuts Weeds with Motor Car—E. E. Thacker, a section foreman near Spokane on the Inland Empire railroad, has recently invented and put in service a motor car that cuts the weeds from the right-of-way while you ride. It carries a sickle in front of the car, extending 2 feet over each side of the track, and another sickle extends 4½ feet out from the center. The front sickle bar is supported on two small wheels and both sickles can be raised or lowered as desired, cutting within 2 inches of the ties. Driven by a four-horsepower gasoline motor, the car can mow 5 miles of weeds per hour, or 50 miles a day.

To Build 55-Mile Highway—The largest and most important trunk highway improvement program known to the northwestern states up to this time is the joint undertaking of the Douglas and Bayfield county boards of supervisors to build a road from Superior, Wis., to Washburn, Wis., and Ashland, about 55 miles. The route follows the Superior-Ashland division of the Northern Pacific railway, which company will thus be able to give assistance and quick dispatch in hauling materials. The two counties have \$100,000 available for the highway and work will begin May 1 with the expectancy of completion by November 1. The sparsely settled northern counties of Wisconsin have made much greater progress in the direction of trunk highway systems than the thickly populated southern counties, where the individual tax burden is much less and where few obstacles, such as building roads through virgin forests, are encountered.



Among the Makers and Dealers



PHILADELPHIA Gets E. V. A. Meeting—The Electric Vehicle Association of America will hold its fifth annual convention this year in Philadelphia during October, the exact date to be announced later.

Pyrene Company Elects Officers—The Pyrene Co. of Missouri, manufacturer of a fire extinguisher, held its annual meeting at St. Louis, last week and elected the following officers: C. G. Morrill, president; H. McK. Jones, vice-president; Stanley M. Riggs, secretary.

Grant Cars for London Buyers—The Grant Motor Co., of Findlay, O., recently made its first shipment of its little run-about to London, the order being for six. The plant is now employing 130 men, and within 2 months the number will be increased to 200.

Vestal Company to Build Factory—The Vestal Motor Co. is asking for bids on the construction of a sales room and factory building at Baum boulevard and Morewood avenue, Pittsburgh, Pa. This site is directly across Baum boulevard from the lot upon which the Ford Motor Co. is erecting its eleven-story factory building.

Equipment Company is Fined—The state of Minnesota has obtained a judgment of \$1,013.54 against the Ball Plug and Equipment Co., St. Paul, Minn., for not complying with the state laws requiring foreign corporations to have a certificate of incorporation from the secretary of state before doing business in Minnesota.

Brass Foundry Concern Bankrupt—The Wambold Mfg. Co., 3009-3021 Lisbon avenue, Milwaukee, a large brass foundry concern, has been thrown into bankruptcy by creditors. Assets are scheduled at \$50,051.61 and liabilities at \$12,594.73. Tight money is given as the cause.

Case Working Full Shift Again—The J. I. Case T. M. Co., of Racine, Wis., has resumed operations on a full schedule after operating short hours and with reduced forces for several months, due to lack of orders. The company employs nearly 5,000 men in its various shops at Racine. All the employees that were laid off have been given employment once more and the usual schedule of work days resumed.

Lee Oldfield Heads Cyclecar Company—Lee Oldfield, 2 years with the Hay Harroun company of Indianapolis, and a former race driver, has been elected president and manager of the reorganized Shapiro-Michaelson Motor Co., Minneapolis, Minn., which will erect a new factory and next year build a cyclecar. The additional capital will be \$50,000. I. A. Webb, mining capitalist of Deadwood, S. D., is secretary and treasurer. Walter Michaelson has resigned as head of the company and will manufacture the new Michaelson cyclecar.

Body Builder to Enlarge Plant—A \$50,000 factory building to be devoted exclusively to the production of closed bodies will be erected at once as an addition to the large works of the Racine Mfg. Co., Racine, Wis., one of the largest producers of motor car bodies in the country. The company recently started a campaign for the closed body business and the results have been overwhelming the present facilities. The new building will be four stories high, 100 by 281 feet in size, of fireproof construction. It will occupy the corner of Eighth and Mead streets, which is part of the site of the old Racine

Mfg. Co. shops which were destroyed by fire in December, 1910, with a loss of \$750,000. The plant has gradually been rebuilt and with the new building will be much larger than the former plant.

Head of Piper Works Resigns—The resignation of J. C. Piper as president of the Piper Machine Works, Indianapolis, has been announced.

Plymouth, Ind., Gets Motor Plant—The Utility Motors Corp., of Chicago, has secured a new factory location at Plymouth, Ind., and has commenced the shipment of machinery there for installation. The concern manufactures motor car engines. The plant was located in Plymouth through the efforts of the commercial club.

Car Rebuilders Enlarging Plant—The Craig-Center Auto Co., Pittsburgh, Pa., dealers in rebuilt motor cars, is erecting an additional building at Grant boulevard and Craig street, immediately adjoining its present plant. The addition will cost \$20,000. At present the Craig-Center company has 300 machines ready for delivery.

Elected to M. and A. M.—The following concerns have been elected to membership in the Motor and Accessory Manufacturers: A. O. Smith Co., manufacturer of axles, pressed steel hubs, etc., Milwaukee, Wis.; Detroit Pressed Steel Co., manufacturer of frames and pressed steel parts, Detroit; the Forbes Varnish Co., manufacturer of varnishes, Cleveland, O.; the Van Sicken Co., manufacturer of speedometers, Aurora, Ill.; the English and Mersick Co., manufacturer of motor car hardware, trimmings, supplies and lamps, New Haven, Conn.; T. P. Powell & Co., manufacturer of patent and enameled leather, Newark, N. J.; the Perfection

Spring Co., maker of motor car springs, Cleveland, O.; and the Pittsburgh Steel Products Co., manufacturer of seamless steel tubing, Pittsburgh, Pa. The Bosch Magneto Co., New York, has been reinstated to membership.

Leaves Motsinger Company—N. H. Motsinger, Jr., secretary and treasurer of the Motsinger Device Mfg. Co., Lafayette, Ind., has resigned and will be succeeded by J. W. Ruzicka, formerly with the Bosch company in Chicago.

Wadsworth Goes Abroad—George W. Wadsworth, engineering manager of the Gray & Davis Co., has started on an extensive European trip to study electric lighting and starting equipments in use on foreign cars, and to arrange for extending the sales of Gray & Davis products across the water.

Three-fourths of Packard Output Sold—According to H. H. Hills, sales manager of the Packard Motor Car Co., three-fourths of the 1914 output of pleasure cars have been sold and there will not be a car for delivery to customers during the months of July and August. March sales were 36 per cent greater than those of any other March in the history of the company, it is stated.

Changes in Abbott Officials—Ferris B. Fick, secretary and treasurer of the Abbott Motor Car Co., has taken over the management of the Pittsburgh branch and the direct supervision of its tributary agencies in a number of states adjoining. He also will act as personal representative of Edward F. Gerber, president of the Abbott company, whose interests have become so diversified as to require assistance in their handling. In addition to Mr. Fick's new duties he will still spend a portion of his time at the De-

Recent Incorporations

Albany, N.Y.—Hope Garage Co., capital stock, \$10,000; incorporators, C. W. Lewis, W. Bule, E. Dady.

Baldwinsville, N. Y.—Penn Spring Works, capital stock, \$28,500; to manufacture springs for motor trucks; incorporators, W. H. Robinson, F. C. Robinson, N. Hee.

Bergen, N.J.—Enterprise Auto Co., capital stock, \$100,000; incorporators, L. H. Dyer and others.

Boston, Mass.—Wheelock-Jeffery Co., capital stock, \$10,000; incorporators, L. N. Wheelock, C. E. Jeffery, H. W. Smith.

Boston, Mass.—George W. Canterbury, capital stock, \$50,000; motor car accessories; incorporators, H. G. Lapham, G. W. Canterbury, E. D. Fullerton.

Bridgeport, Conn.—Arthur McMullen, Jr., Automobile Co., capital stock, \$5,000; incorporators, A. McMullen, Jr., A. McMullen, J. McMullen.

Bryan, O.—Bryan Automobile Co., capital stock, \$15,000; to deal in motor cars; incorporators, O. W. Gleason, E. D. Spangler, J. H. Roe, W. T. Gardner, H. W. Gardner.

Cleveland, O.—Swan Demountable Body Co., capital stock, \$25,000; to make bodies and tops; incorporators, T. Swan, R. G. Nierman, G. K. Selick, W. T. Lutey, A. E. Gibbons.

Cleveland, O.—Cleveland Sightseeing Co., capital stock, \$10,000; to operate motor-driven sightseeing cars; incorporators, J. A. Nally, H. V. Nally, K. M. Neale, E. G. Nally, W. G. Kanin.

Cortland, N. Y.—Thomas Carbon Remover Co., capital stock, \$10,000; to remove carbon from gas engines; incorporators, L. B. Thomas, W. W. Letts, G. B. Letts.

Dover, Del.—Salvador Motor Co., capital stock, \$500,000; to manufacture motor cars; incorporators, S. J. Richards, J. F. Brown, F. F. Phillips, Jr.

Dover, Del.—Motor Air Pumping Co., capital stock, \$250,000; to manufacture pumps; incorporators, W. M. Pyle, G. H. Stiegler, L. W. E. McCarthy.

Dover, Del.—Hercules Truck Mfg. Co., capital stock, \$100,000 to manufacture trucks; incorporators, F. L. Metten, A. Crossgrove, A. Whartenby.

Fulton, N. Y.—West Side Motor Car & Supply Co., capital stock, \$2,000; incorporators, R. E. Harrison, E. V. McGinnis, J. J. McGinnis.

Huntington, N.Y.—Singer Motor Co., capital stock, \$175,000; incorporators, C. A. Singer, C. A. Singer, Jr., H. R. Callisen.

Ironton, O.—Auto Valve Co., capital stock, \$10,000; to manufacture and deal in valves; incorporators, O. Ebert, A. M. Johnson, E. B. Newman, D. C. Jones, C. B. Egerton.

Lowell, Mass.—Moody Bridge Garage Co., capital stock, \$4,000; incorporators, J. M. Ranger, J. P. Whigham, G. W. Ranger.

Mount Kisco, N. Y.—Mount Kisco Modern Garage, capital stock, \$5,000; incorporators, M. L. Glou, S. Olim, C. Olim.

New York—Ray Auto Renting Co., capital stock, \$5,000; incorporators, H. J. Benjamin, A. Meyers, W. Meyers.

New York—Joseph Huber, capital stock, \$10,000; incorporators, T. F. Doyle, P. Huber, J. Huber, Jr.

New York—John E. Pye & Co., capital stock, \$5,000; general motor car business; incorporators, C. Pye, J. E. Pye, G. J. Bash.

New York—Entz Motor Car Corp., capital stock, \$3,000,000; incorporators, A. Widder, W. B. Harding, R. H. Montgomery.

New York—American Volturette Co., capital stock, \$6,000; incorporators, H. A. Foote, F. V. Wishart, A. E. Villard.

New York—Security Auto Lock Co., capital stock, \$100,000; to deal in locks; incorporators, E. Rothschild, S. C. Weiskopf, W. E. Kemp.

Somerville, Mass.—King Rubber Co., capital stock, \$50,000; incorporators, C. A. Briggs, E. L. Dickerman, D. Kingsbury.

Springfield, Mass.—Sanford Street Garage Co., capital stock, \$10,000; incorporators, G. C. Turner, W. J. Hyland, J. P. Enright.

St. Louis, Mo.—Finaline Mfg. Co., capital stock, \$20,000; to manufacture varnish; incorporators, T. W. Carter, D. H. Morische, E. L. Foth.

Toledo, O.—H. E. Throne Automobile Co., capital stock, \$30,000; incorporators, H. E. Throne, F. C. Schaal, G. C. Bradley, C. J. Clapp, W. H. Schroeder.

Youngstown, O.—Car-Nation Auto Sales Co., capital stock, \$10,000; to deal in motor cars; incorporators, M. H. Squire, B. O. Shulman, A. Kessler, L. J. Shuman, A. Cassano.

troit plant and will continue to be active in the management of the concern. D. E. Perry has been selected as purchasing agent to succeed Mr. Fick.

Gets License for Battery Connector—The Emil Grossman Mfg. Co., Brooklyn, N. Y., has been licensed under the Hammond patent, U. S. letters patent 1,086,820, dated February 10, 1914, to manufacture the Holdfast battery connector.

Seeks Ford Export Headquarters—Ex-Mayor J. Edward Barry, of Cambridge, Mass., who has been responsible for many corporations locating in his city while he was mayor, has gone to Detroit to try to induce the Ford company to make its eastern plant the foreign export headquarters.

Specializes on Garage Equipment—The Keller Pneumatic Tool Co., of Fond du Lac, Wis., organized recently, has commenced the manufacture of a line of compressed air tools of all kinds and will make a specialty of garage and repair shop devices. Julius Keller is president and general manager of the company.

To Direct Empire Sales in Canada—Hoover Holton, who has been connected with the Empire Automobile Co., Indianapolis, for some time, has been appointed Canadian sales manager of the Empire. The main offices of the Empire company in Canada are at London.

Re-open Galion Truck Plant—The Galion Dynamic Truck Co., Galion, O., recently organized by W. J. Geer and others to operate the former plant of the Cleveland-Galion Motor Truck Co., started work at the plant last week. It is the intention to continue the manufacture of motor trucks and to gradually increase the force of workmen.

Howard to Build Trucks—Robert G. Howard, formerly manager of the Vulcan and Bessemer branches in Boston, has resigned to devote his time to the production of a new light truck he proposes to build that is to have a four-cylinder motor of 22 horsepower and shaft drive and capable of carrying from 1,000 to 1,500 pounds.

Pyrene Creates Motor Car Department—Reduced insurance rates offered motorists with cars equipped with Pyrene fire extinguishers and the resultant interest in the company's product has caused the Pyrene Co. to establish a special motor car department to act free of charge as a general information bureau and counsel on all matters pertaining to motor car fire insurance. C. Louis Allen, formerly New York manager of the Service Recorder Co., is in charge.

Additions to S. M. C. Plant—The General Motors Truck Co., Pontiac, Mich., has recently completed some additions to its equipment. Although the factory is accessible to the city water mains and is equipped with a sprinkler system, the company has installed a 100,000-gallon reservoir as an added protection against fire. A number of new cement floors have been put in the factory and several thousand dollars have been expended in rearranging store rooms and other equipment to facilitate the handling of business. The factory force has been largely increased during the past 60 days.

Establish Packard Depot at London—In line with the growing popularity of American cars abroad, the Packard Motor Car Co. of Paris has established a branch office, service station and rental depot in London, England. The new establishment is located at No. 7 Lower Belgrave street, off Buckingham Palace road. It will carry a complete supply of parts. It also arranges for the crating and shipping of cars and assists in mastering the many formalities which must be complied with before the start of an extended continental tour. As the only continental branch representing an American car, the Packard station in Paris has many

demands from motor tourists abroad. In response to requests for rental service by tourists at the Riviera during the winter season, a station has been established at Nice.

Error in Officers and Capital—In the April 2 issue of Motor Age an error was made in announcing the list of officers and capital stock of the Kramer Governor Co., Milwaukee. J. W. Anderson, not John H. Hurley, is secretary and treasurer and the authorized capital is \$125,000 instead of \$25,000 as stated.

Club Rooms for Chauffeurs—The Peerless Motor Car Co. of St. Louis has set aside a large room as a club room for chauffeurs. The room, which is fitted out with a telephone, piano, pool table and bath together with other conveniences, is a decided hit with the boys who have formulated rules which forbid expectorating and swearing.

Leaves Racine Mfg. Co.—Harold Smith, for several years secretary and purchasing agent of the Racine Mfg. Co., Racine, Wis., maker of motor bodies, has tendered his resignation to take effect April 20 when he will become vice-president of the B. G. and M. Mfg. Co., Chicago, manufacturer of brass and aluminum castings and metal stampings.

Tire Output Passes 10,000 Mark—Last Tuesday morning the whistle at the factory of the Goodyear Tire and Rubber Co. blew ten sharp blasts, in celebration of the fact that on Monday, for the first time in the history of any tire factory in the world, daily production of pneumatic tire casings had passed the 10,000 mark. The total for Monday was 10,635.

Tennant Resigns from Stewart-Warner—G. Tennant, vice-president of the Stewart-Warner Speedometer Corp., has resigned to take effect May 1. After that date he will devote his entire attention to Tennant Motors, Ltd., Chicago agent for the Simplex, National, Abbott-Detroit and Briscoe cars. During his connection with the Stewart-Warner corporation, he had charge of all sales outside of speedometers.

Billiken Company Elects Officers—The Milwaukee Cyclecar Co., 511-515 First avenue, Milwaukee, which is manufacturing Billiken cyclecars, has elected these officers: President, Stanley H. Eigel; vice-president, Samuel P. Carroll; secretary and treasurer, Fred W. Bollow. Mr. Eigel is chief engineer and designer. The corporation is capitalized at \$50,000 and is working on the basis of 3,000 cars for the 1914 season.

Starts Shipment of New Hudson—The first shipments to dealers of the new 5-passenger light six model is announced by the Hudson Motor Car Co., Detroit. It is identical in every way with the 6-passenger six with the exception of the rear seat and tonneau. By a slight change in design it has been possible to gain increased seating width without losing any of the features of the streamline body.

Bosch Adds 24 Service Stations—The Bosch Magneto Co. has recently added to its list the following supply stations: Motor Supply and Tire Co., Akron, O.; Albany Garage Co., Albany, N. Y.; Augusta Garage, Augusta, Me.; Bangor Motor Co., Bangor, Me.; Bath Auto and Gas Engine Co., Bath, Me.; Motor Supply and Tire Co., Cleveland, O.; Troy Automobile Exchange, Cohoes, N. Y.; Motor Supply and Tire Co., Columbus, O.; Warren Garage, Elkhart, Ind.; Pearce Street Garage, Gloucester, Mass.; Blair Motor Co., Logan, Utah; Court Motor Car Co., Marietta, O.; George W. Roberts Electrical Works, Marysville, Cal.; Minot Auto Co., Minot, N. D.; J. P. Gayle Supply Co., Newport News, Va.; Port Washington Garage, Port Washington, N. Y.; Provo Machine and Foundry Co., Provo, Utah; St. Albans Foundry Garage, St. Albans, Vt.; Jensen Bros. Auto Co., Santa

Cruz, Cal.; Gavin-Williams Co., San Diego, Cal.; Troy Automobile Exchange, Troy, N. Y.; Utica Cycle Co., Utica, N. Y.; Morgan and Williams Co., Warren, O., and Brass City Auto Co., Waterbury, Conn.

New President for Trade Association—R. H. Johnson, general manager of the White Co. of New York, has been elected president of the Automobile Trade Association of New York State to succeed Arthur M. Day, who recently severed his connection with the motor car industry.

Detroit Branch Is Discontinued—The Emil Grossman Mfg. Co., which a short time ago consolidated its Detroit and New York factories in a new plant at Brooklyn, has discontinued its stock branch at Detroit and hereafter will have only an office in the motor car metropolis, located in the Ford building with G. Edward Shaw in charge.

Dealers Ask Reduction in Fees—On the ground that the increase of the fees for registering manufacturers and dealers from \$10 to \$20 is unreasonable, Ohio motor car dealers have started a movement to have the fees reduced to the figures which prevailed in 1913. It is argued that the doubling of the fees is particularly burdensome to the small dealers in the state.

Jeffery Daily Output 35 Cars—New men are constantly being added to the working force of the Thomas B. Jeffery Co., Racine, Wis. Since the first of the year the Jeffery company has been operating 13 hours a day and during this period shipments have increased 104 per cent over the shipments during the corresponding period of last year. The daily average is now 35 cars a day, 208 having been shipped last week.

Marketing New Signal Device—The Automobile Safety Signal Co. has recently opened a salesroom in Seattle, with S. H. Buck as manager and H. L. Heil as sales manager. This concern will market what is known as the Quartette signal. It consists of four convex metal boxes, one of which is placed on each mud guard. Arrows in these boxes indicate right or left. It is operated by electricity and at night is electrically lighted and can be read at a distance of 100 feet.

Mercer Has to Use Tent—As a result of the demand for its product, the Mercer Automobile Co. has had to erect a large tent to relieve congested manufacturing conditions. Until permanent additions can be made to the factory buildings, a tent, measuring 90 by 150 feet, is being used for some of the final operations of chassis assembly. The tent was secured from Robbins circus, which has been wintering in Trenton, N. J., the Mercer home. Several large additions were made to the Mercer plant only a few months ago, and it was thought this would give sufficient room for some time to come, but these new buildings have been rapidly outgrown.

Send Souvenir to Colonel Pope—There was sent from New York to Hartford, Conn., last week a testimonial consisting of a leather-bound book of letters from 1,000 friends of Colonel Pope, in celebration of his seventieth birthday. Colonel Pope, who is treasurer of the National Automobile Chamber of Commerce, reached the age of three score and ten on January 9, during the motor car show at Grand Central Palace, New York, and was presented with a grandfather's clock. Believing that one of his standing, with so many friends in the bicycle and motor car industries, should be further appreciated by something of an original character, a committee, of which S. A. Miles was chairman, proceeded to procure the letters. Each letter is on an individual page, the whole being bound in leather. The signatures include almost every prominent man now living who ever had anything to do with the manufacture and sale of bicycles and motor cars.



Brief Business Announcements



LANCASTER, O.—W. D. Boyer has taken the local agency for Republic tires.

Indianapolis, Ind.—The Ham-Meix Mfg. Co., maker of starting systems, has opened a plant at 5 West North street in this city.

Denver, Colo.—The Boss Rubber Co. of Denver, distributor in Colorado of Motz tires, has opened branches in Colorado Springs and Pueblo.

Kansas City, Mo.—The Frazier Auto Parts Co. has been organized here to handle the line of Ford accessories made by the Auto Parts Co. of Hartford, Conn. Quarters have been taken at 1912 Grand avenue and a repair shop, exclusively for work on Ford cars, will be opened.

DePere, Wis.—The DePere Civic League, DePere, Wis., has received a proposition from outside parties to establish a cyclecar factory in that city if local capital can be interested. It is proposed to start a company with \$75,000 capital, about one-third of which is to be local money.

Kansas City, Mo.—A. P. Penbrook, former sales manager of the Buick Chicago branch, is now local manager of the Oakland branch here. Mr. Penbrook formerly lived in Kansas City and is thoroughly familiar with the southwest for which this city is the distributing center. He succeeds J. F. Walsh, factory representative of the Oakland com-

pany, who was temporarily in charge of the local company.

Los Angeles, Cal.—Charles A. Mullen has recently succeeded J. S. Binford as general sales agent for the Savage Tire Co. in Los Angeles. The new manager comes from Chicago.

Lancaster, O.—D. L. Hansberger has leased a site on the corner of Columbus and Chestnut streets upon which will be erected a garage and sales agency. Ford cars will be handled.

Indianapolis, Ind.—The Marion Motor Car Co., Indianapolis, has opened a retail sales branch in that city at 343 North Capitol avenue. The branch has been placed in charge of Edgar Updyke and S. A. Glover.

Milwaukee, Wis.—R. A. Schwartzburg, who engaged in the motor car selling business at Milwaukee, Wis., several months ago, has filed a voluntary petition in bankruptcy, giving his assets at \$2,500 and liabilities at \$3,527.

Los Angeles, Cal.—William R. Reuss, who has been in the motor business in southern California since the days of the one-lunger and who is now associated in business with Bert Dingley, the former racing driver, has purchased the Los Angeles factory branch of the F. B. Stearns Co. and is now Stearns-Knight agent for this city and surrounding

territory. The maker has assigned a factory man to direct the work in the local service station, 1000-02 Olive street.

Columbus, O.—Ray E. Jordan has opened a repair shop at 98-102 North Front street to specialize in repairing Ford cars.

Hartford, Conn.—The Andrus & Naedle Co. has been appointed Hartford representative of Miller tires.

Chicago—The Chicago branch of the Motz Tire and Rubber Co. has moved from its former location, 2025 Michigan avenue, to its new quarters at 115 East Thirtieth street.

York, Pa.—Thomas Burneson, formerly manager of the Kline Motor Car Co.'s branch in this city, has accepted the position of district manager for Gromm Motor Truck Co. of Lima, O. Mr. Burneson will be in charge of the Pennsylvania and Maryland territory and will have his headquarters in York.

Kansas City, Mo.—The Haynes company has established a selling agency for five states here. A new factory branch, opened at 708 Grand avenue, will have direct charge of the business in Missouri, Oklahoma, Kansas, Nebraska and Arkansas. J. C. Barcus, western sales manager for the company, will locate here and assume control of the company's business. The Haynes car has not been represented in Kansas City since

Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

Town	Agent	Make
Akron, O.	Diamond Auto Garage Co.	Herff-Brooks
Aurelia, Ia.	Jas. Hartigan	Herff-Brooks
Angola, Ind.	Barton Golden	Herff-Brooks
Appleton, Minn.	Appleton Auto Co.	Kisselkar
Alton, Ill.	H. M. Schweppe	Hudson
Albuquerque, N. M.	Interstate Auto Co.	Oakland
Ashtabula, O.	George H. Fassett	Oakland
Appleton, Wis.	H. E. Griffin Auto Co.	Oakland
Arkansas City, Kan.	Collision Brothers	Haynes
Brownstown, Pa.	Wm. S. Evans	Herff-Brooks
Belle Plain, Ia.	V. E. Boody	Herff-Brooks
Brocton, Mass.	Geo. E. Tuscan	Herff-Brooks
Breckenridge, Minn.	Interstate Garage Co.	Kisselkar
Brainerd, Minn.	Hoffman & Bane	Kisselkar
Bemidji, Minn.	Northern Auto Co.	Kisselkar
Booneville, Mo.	Henry Efinger	Hudson
Bradgate, Ia.	P. H. Barger & Co.	Oakland
Bode, Ia.	A. M. Anderson & Co.	Oakland
Brooklyn, N. Y.	F. H. Cronebach	Chandler
Beloit, Kan.	Johnson & Mularkey	Chandler
Buffalo, Kan.	C. E. Miller	Pathfinder
Buffalo, Kan.	C. E. Miller	Empire
Brookfield, Mo.	Dickinson Motor Co.	Oakland
Burlington, Vt.	P. T. Donovan	Oakland
Boone, Ia.	Chas. W. Nelson	Herff-Brooks
Columbus, O.	Columbus Auto Sales Co.	Herff-Brooks
Cairo, Ill.	A. D. Teer	Hudson
Cedar Rapids, Ia.	Sherick & Kurick	Herff-Brooks
Cape Girardeau, Mo.	J. W. Brownstein	Coe
Cape Girardeau, Mo.	Fred A. Groves	Hudson
Centralia, Ill.	C. P. Glore	Hudson
Cynthiana, Ky.	J. F. David	Oakland
Clarion, Pa.	Central Garage	Chandler
Charleston, S. C.	Charleston Motor Sales Co.	Chandler
Circleville, O.	Joseph Metzger	Pilot
Chelsea, Ia.	Jos. Uchytill & Co.	Herff-Brooks
Chateaugay, N. Y.	Humphrey-Hyland Co.	Oakland
Caney, Kan.	H. E. Truskett	Pathfinder
Caney, Kan.	H. E. Truskett	Empire
Columbus, Kan.	D. E. Heter	Pathfinder
Columbus, Kan.	D. E. Heter	Empire
Craig, Mo.	L. J. Strickler	Pathfinder
Craig, Mo.	L. J. Strickler	Empire

Town	Agent	Make
Columbus, O.	Tope & Beamer	Studebaker
Carrollton, O.	Harry L. Haight	Jackson
Danville, Ill.	O. W. Couden	Herff-Brooks
Dayton, O.	G. S. Staub	Pilot
Deming, N. M.	New Mexico Implement Co.	Oakland
Dawson Springs, Ky.	J. E. Hayes	Oakland
Dewey, Okla.	Pope Garage Company	King
Detroit, Minn.	Frazee Bros.	Kisselkar
Elliott, Ill.	Nels Sunnes	Herff-Brooks
Earlville, Ia.	Andrew Morman	Herff-Brooks
Erie, Pa.	D. L. Curtis	Herff-Brooks
Elkhart, Ia.	Frederick Maglot	Herff-Brooks
Ebersonville, Mo.	S. E. Cook	King
Freeman, S. D.	Farmers' Co-Operative Society	Oakland
Findlay, O.	Rummell's Garage & Auto Service Co.	Saxon
Garner, Ia.	F. S. Livermore	Herff-Brooks
Gilmore City, Ia.	D. Milholland	Herff-Brooks
Gardiner, Kan.	J. M. Anderson	King
Guthrie, Okla.	Gustave A. Erixon	Oakland
Harrisburg, Pa.	West End Garage	Herff-Brooks
Houston, Tex.	Allie E. Dickson	Ford
Hartford, Conn.	Asylum Hill Garage	Davis
Huron, O.	G. E. Rhinemiller	Hupmobile
Hamilton, O.	Carr & Baxter	Westcott
Hannibal, Mo.	J. F. Meyer	National
Hollensburg, Ind.	George Wolf	Pilot
Huntington, W. Va.	W. B. Martin	Franklin
Herculaneum, Mo.	J. D. DeBuchanne	Hudson
Hillsboro, Ill.	MacDavid Auto Co.	Hudson
Huron, S. D.	E. I. Bowe	Kisselkar
Indiana, Pa.	Clymer Motor Car Co.	Herff-Brooks
Indianapolis, Ind.	Interstate Automobile Co.	Interstate
Ironton, O.	A. H. Washburn	Hupmobile
Ishpeming, Mich.	Philo P. Chase	Pilot
Jamestown, N. D.	Wallace & Donnelly	R. C. H.
Keokuk, Ia.	W. W. Perdew	Kisselkar
Lebanon, Pa.	Isaac Plasterer	Herff-Brooks
Lancaster, Pa.	Samuel K. Landis	Herff-Brooks
Leavenworth, Kan.	Robert Keller	Haynes
Los Angeles, Cal.	Leon T. Shettler	Grant
Littleton, N. C.	W. G. Coppersmith	Hupmobile

a local selling company dissolved several months ago.

Zanesville, O.—The Wedge garage has taken the agency for Republic tires.

Hartford, Conn.—W. E. Gallup has opened a tire store at 177 Allyn street and will feature Hardman tires.

Columbus, O.—The name of the Ohio Tire and Rubber Co., 183 East Gay street, has been changed to the McClure Tire and Rubber Co. The concern does vulcanizing.

Columbus, O.—The Kinner & Gager Co. of Columbus has opened a department for the repair of metal parts of motor cars. The repair department will do all kinds of brazing.

York, Pa.—Edward Swartz, until recently purchasing agent for the Pullman Motor Car Co. of this city, has resigned to accept the local agency for the Saxon car. Mr. Swartz will be succeeded by H. F. Koller, formerly in charge of the purchasing department of the Kline Motor Car Corp., Richmond, Va.

Fond du Lac, Wis.—J. O. Frish, manager of the Fond du Lac, Wis., branch of the Rumely Products Co., has taken the agency for the Richmond car, in association with Henry Schwartz and will conduct a garage. The agency is entirely separate from the Rumely branch, however, being handed by a partnership known as Frish & Schwarz.

Philadelphia, Pa.—As indicative of the growth of business in the second-hand car, the Roman Automobile Co., largest in this city, has just opened a fourth sales and showroom at 128-130 North Broad street. The other three stores are located at 249 North Watts street, 1740-1742 Market street and Nos. 249-251 North Broad street. Ludwig

Coming Motor Events

SHOWS, CONVENTIONS, ETC.

April 12-19—Austrian show.
April 14-18—Deadwood, S. D., show.
April 18-20—Denmark Motor Car Exposition.
September 26-October 6—Berlin show.
June 23-26—S. A. E. summer meeting, Cape May, N. J.
October 16-26—Paris show.
November 6—Olympia show.
November 9-14—American Road Congress, Atlanta, Ga.

CONTESTS

April 19-29—Coupe de Tourisme, 1,000-mile cyclecar and light car endurance test around France.
April 22—Track meet, Bakersfield, Cal.
May 4—Start of 2,500-mile sociability run from Colorado through Texas, Oklahoma and Kansas.
May 9—Hill climb, Atlanta, Ga.
May 25-26—Targa Florio race, Sicily.
*May 30—Indianapolis 500-mile race.
May 30—New York track meet.
May 30—Track meet, Providence, R. I.
June 1—Florio cup race, island of Sicily.
June 6-7—Track meet, St. Louis, Mo.

Isenburg is the general manager, secretary and treasurer of the company.

Seattle, Wash.—Two years of steady growth has necessitated the northwest branch of the Metz company seeking larger quarters in Seattle. The branch removed last week into a new home at the corner of Belmont avenue

June 10-11—Isle of Man road races, Great Britain.

*June 18—Hill climb, Uniontown, Pa.

June 30—Track meet, Sioux City, Ia.

July 3-4—Road races, Tacoma, Wash.

July 4—French grand prix, Lyons.

*July 4—Three hundred mile race, Sioux City, Ia., speedway.

July 4—Track meet, Providence, R. I.

July 18-19—Speedway races, Seattle, Wash.

July 25-26—Belgium grand prix road races.

August 15—Le Mans cyclecar grand prix race.

July and August—French army truck subsidiary trials.

August 2-9—Six day cyclecar reliability in French Alps.

August 16—Coupe Internationale; light car race, Le Mans.

August 17—Grand Prix of France, Le Mans.

August 21-22—Road races, Elgin, Ill.

September 5—Track meet, Milwaukee, Wis.

September 6-7—Italian grand prix.

September 7—Track meet, Providence, R. I.

September 9—Speedway races, Pomona, Cal.

September 9—Road race, Corona Beach, Cal.

September 14—Track meet, Milwaukee, Wis.

October—Gallion hill climb, Paris.

October 2-3—Track meet, Oklahoma City, Okla.

October 2-3—Track meet, Trenton, N. J.

November 8-11—Track meet, Shreveport, La.

November 15—Kerosene motor tests, Paris, France.

November—El Paso-Phoenix road race.

* Sanctioned by A. A. A.

and East Pike street, where it has triple the amount of floor space.

Pasadena, Cal.—The Pasadena Rubber Supply Co. of Pasadena, Cal., and the Long Beach Motor Supply Co. of Long Beach, Cal., have been named as distributors of Batavia tires.

Recent Agencies Appointed by Motor Car Manufacturers—Continued

PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Lewiston, Ida.	J. T. Atkinson	Hudson	Silver City, N. M.	Will Rowlee	Monarch
Lime Springs, Ia.	John L. Williams	Hupmobile	Saratoga, N. Y.	Central Auto Sales Co.	Chandler
Laurel, Mont.	Stripp & DeGarmo	Hupmobile	Seattle, Wash.	Grant Motor Agency	Grant
Los Angeles, Cal.	Chandler Motor Car Co.	Chandler	St. Joseph, Mo.	E. C. Eads Auto Co.	White
Lewiston, Me.	Hall & Knight	Kisselkar	Springfield, Mo.	J. E. Atkinson	Chander
Locke Mills, Me.	E. L. Tebbets Co.	Kisselkar	South Boston, Va.	Ballow Motor Co.	Oakland
Miles City, Mont.	Myers & Lindeberg	Kisselkar	Springvale, Me.	E. E. Wentworth	Kisselkar
Mattese, Mo.	Aug. Kassebaum	Pathfinder	Seattle, Wash.	Northwest Kisselkar Co.	Kisselkar
Macon, Ga.	Steinhauer & Wight	Chandler	Shawano, Wis.	Schweers Hdwe. Co.	Kisselkar
Marshall, Kan.	McAnnus & Son	Haynes	Swampscott, Mass.	Harry M. Doane	Herff-Brooks
Middleport, O.	H. O. Ewing	Buick	Taunton, Mass.	I. W. Short	R. C. H.
Moberly, Mo.	C. L. Leitch	King	Tyrone, Pa.	Penn Auto Co.	Herff-Brooks
Marysville, O.	H. I. Huffman	Oakland	Taylorville, Ill.	John Anderson	Oakland
Mt. Sterling, O.	Roy Baxter	Oakland	Topeka, Kan.	Seery & Morton	Pathfinder
Mobile, Ala.	Ashland Motor Car Co.	Chandler	Topeka, Kan.	Seery & Morton	Empire
Montpellier, Vt.	Lane Mfg. Co.	Kisselkar	Toledo, O.	E. W. K'Burg	R. C. H.
Mt. Pleasant, Ia.	Wind Bros. Auto Co.	Herff-Brooks	Texarkana, Tex.	F. E. Baxter	Oakland
Nashua, N. Y.	Chandler Motor Car Co.	Chandler	Tulsa, Okla.	William & Stacys	King
Newell, Ia.	Herman Zinn	Herff-Brooks	Tipton, Ind.	F. U. Campbell	Pilot
New Haven, Conn.	Knowles & Rudolph	Chandler	Tarkio, Mo.	G. G. Volker	White
New Brunswick, N. J.	Perth Amboy Garage	Chandler	Terry, Mont.	L. W. Lamb	R. C. H.
North Vernon, Ind.	Litchfield Brothers	Pilot	Thomasville, N. C.	C. F. Finch	Hupmobile
Norwalk, O.	Big Garage	Chevrolet	Topeka, Kan.	W. T. Dawson Auto Co.	King
Norristown, Pa.	Norris City Garage	Car-Nation	Utica, Minn.	R. D. Loudon	Chandler
Nordheim, Tex.	William V. Raab	Pilot	Worcester, Mass.	Peter Wellin	Herff-Brooks
Newburgh, N. Y.	Broadway Garage	Chandler	Wheeling, W. Va.	Jones & Kratzer	Herff-Brooks
Northwood, Ia.	I. O. Kaasa	Oakland	Waverly, Ia.	Hornsbehn Creamery Sup. Co.	Herff-Brooks
Olathe, Kan.	N. F. Dunn	King	Wallingford, Ia.	J. O. Kasa	Oakland
Pittsburgh, Pa.	The Klingler Co.	Herff-Brooks	Wilmington, O.	Dorsey Wolgamuth	Oakland
Patchogue, L. I.	N. Y. Bellman Auto Co.	Kisselkar	West Salem, O.	Smalley Auto Co.	Oakland
Plainfield, N. J.	E. & C. Auto Co.	Chandler	Watertown, N. Y.	Edwards Auto Co.	Chandler
Providence, R. I.	H. E. Bradford	Pilot	Washington, D. C.	Probey-Haynes Motor Co.	Briscoe
Peekskill, N. Y.	Lawson's Garage	Chandler	Washington, D. C.	Cole Motor Sales Co.	Cole
Pittsburgh, Pa.	Hiland Automobile Co.	Kisselkar	Wauseon, O.	Conway & Brown	Overland
Philadelphia	Ralph D. Earle Co.	Empire	Wauseon, O.	Conway & Brown	Hudson
Rheems, Pa.	Landis Bros.	Herff-Brooks	Wichita, Kan.	Morlarity Motor Co.	Lozier
Rochester, N. Y.	McKenney & Gilpin	Herff-Brooks	Winfield, Kan.	Collison Brothers	Haynes
Raymond, Ia.	P. J. O'Connor	Pilot	West Alexandria, O.	Jesse I Rhodes	Oakland
Riley, Kan.	William S. Sylvester	Pathfinder	Watertown, S. D.	Wolf Auto Co.	Kisselkar
Riley, Kan.	William S. Sylvester	Empire	Xenia, O.	Xenia Taxicab Co.	Buick
Skylight, Ky.	W. M. Clore	Oakland	York, Pa.	W. Arch Miller	Oakland
Sabina, O.	L. E. Whinery	Oakland	York, Pa.	G. Edward Swartz	Studebaker
			Youngstown, O.	J. Ralph Seldner	Chandler

The Motor Car Repair Shop

AT this time of the year when the energetic motorist is getting his car ready for the summer, the question of motor tuning is an important issue and in nine cases out of ten valve grinding is one of the necessary jobs. Although a great many owners have this work done at a repair shop, many are capable of performing the work themselves.

At present there are two good methods of doing this work, one in which a valve seating set is used and the other where most of the work of grinding is done by hand. Many prefer the former, believing that the work is better and at the same time requires less time.

The reseating tools, which may be bought at any good supply house, consist of a countersink for the valve seat and a means of cutting the valve face. One of these devices is shown in the illustration on this page. The valve is clamped into a holder within which is a cutter, which removes a very small portion of the valve face and cuts at the proper angle. The countersink is not of unusual construction. These tools are made for different size valves. It is not essential that a valve cutter be used if a lathe is at hand, for then about .001 inch of metal may be removed from the valve in the lathe. In many shops the valve is ground for a short length of time, even after cutting and seat-counterboring.

The hand method described below is rather long but gives good results, and by reading how this is done, one can get hints which will help, should the reseater be used.

Ordinary Grinding Method

Before any grinding is done the following materials are necessary: A screwdriver or a brace for the actual operation of grinding, grinding compound which may be bought at any supply store, some cot-

Methods of Reseating Valves

ton waste and a light spring about 2 inches long of sufficient diameter to encircle the valve guide.

Remove the cylinder plugs above the valves. Lift the valve against spring tension with a valve lifter, which may be bought at a supply store, and then remove the small piece of metal underneath the valve support. One hand operates the valve lifter while other removes the support. The valve spring will drop down as soon as the lifter is removed. The valve may then be pushed upward and out of the motor.

Usually 1, 2, 3, etc., appears somewhere on the valve, which indicates the cylinder into which the valve fits. As each valve is removed it should be placed on the bench and intake and exhaust valves separated.

Preventing Dirt Entrance

To prevent any dirt getting into the cylinder place some cotton waste R, as shown in the illustration herewith. Turn the motor over until the valve tappet which operates the valve you are to grind, is in the closed position. That is, down as far as it will go. This should be done with each tappet before its valve is ground in. If it is not the valve will not seat.

Take any valve, and with a knife spread a little coarse grinding compound on the face. The face is F in the illustration. Slip the small spring over the valve stem and then place the valve in its own guide in the cylinder. Place the bit of the screwdriver or brace into the slot of the valve and place the handle of the screwdriver between the palms of the hands as shown. Press down slightly so that the valve face F touches the valve seat S. Rub the hands back and forth so that the valve makes a half turn each time. Each

few turns release the pressure on the spring and allow the valve to leave its seat. This should be continued for about 1 minute and then the valve removed and cleaned thoroughly in gasoline. Should the face and seat appear an even grey color then grinding is complete. Should either contain any black spots the grinding should continue. If there are many black spots use coarse compounds, if few use the fine. When all the valves and seats have an even grey color they should be replaced as follows:

Replacing the Valves

Place the valve in its guide. Then slip the valve spring and support over the valve stem. With the spring lifter compress the spring and while it is compressed slip the supporting device through the hole in the stem. Sometimes the valve will go upward when the spring is compressed. Hit the top of the valve with the handle of a hammer to force it down.

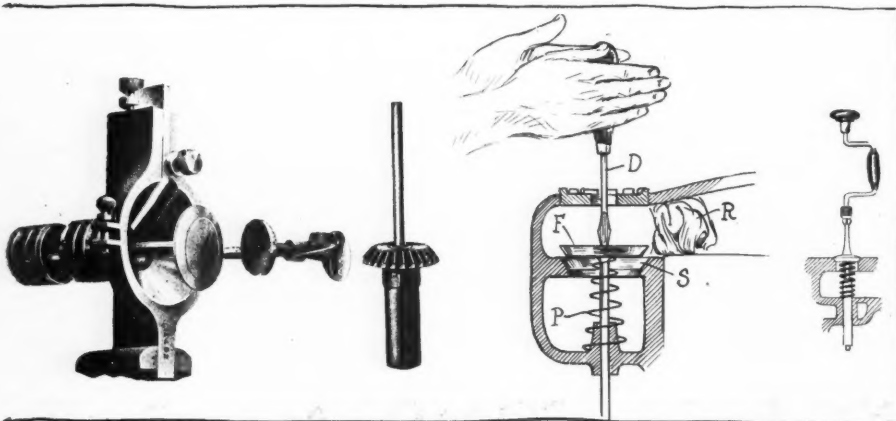
The valves are adjustable by means of the tappets which are usually fitted with nuts and lock nuts. The clearance between the tappet and valve stem should be as small as possible. About .015 inch is allowed usually for the intake and .02 for the exhaust but if these distances cause excessive noise make the clearance smaller. It is best always to adjust the valve tappets while the motor is hot.

Getting Gasoline from the Tank

Should the driver of a motor car have occasion to prime the cylinders and not finding a priming can at hand, the following suggestions will prove of value. The simplest way for getting enough gasoline for 1 priming is to drop a piece of cloth or cotton waste, to which a string has been tied, into the gasoline tank so that the cloth may absorb fuel. After removing the cloth the priming cup should be opened and the cloth or waste squeezed above the opening. Another simple method is to take some part of the motor which will hold liquid and lower it into the fuel tank. A deep valve plug serves the purpose well and it should be lowered sufficiently by a wire, to pick up some gasoline. If the valve cap is too large so that it will not enter the fuel tank opening look around the motor for some other small cuplike part.

Care of Tools

In using wrenches and other tools which are case-hardened, one often finds that the metal has become knicked and cut after being used. This is due either to poor previous hardening or to the completing wearing of the hardened portion. When wrenches begin to show signs of softening the best procedure is to remove the cuts, etc., by filing and then reharden the tool.



TWO METHODS OF RESEATING VALVES

At the left is shown the tools necessary for reseating valves by cutting from the face and seat. There are many forms of reseaters on the market. At the right is shown the ordinary grinding method. Special valve-grinding tools are sometimes used for this work.



If you will take the trouble to look up "springs" in the various encyclopedias and other authorities, you will find that springs are regarded as ill suited for use in all forms of measuring devices, except those, such as the thermograph, where the variable nature of the spring is used to measure temperature.

This proves that springs are affected by the slightest changes in temperature, and, consequently, cannot be expected to be constantly accurate. For this reason, they have been eliminated from measuring devices as rapidly as an exact method of control could be found.

The Holley carburetor has no springs in its construction.

It depends for its operation upon natural forces of gravity and air pressure.

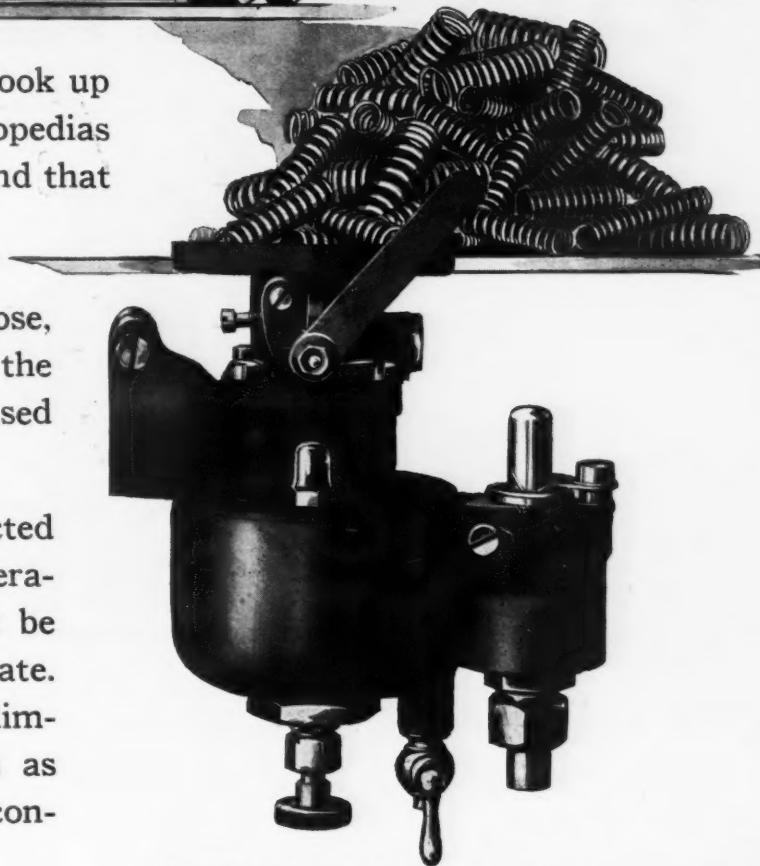
That is the reason why it is so accurate and reliable—why it has only one adjustment and no-moving-parts.

It is as much superior to the ordinary carburetor as the wireless is to the old system of telegraphy. Why don't you make your truck up-to-date?

If there is no dealer near you, write direct to

HOLLEY BROTHERS COMPANY DETROIT MICHIGAN

When Writing to Advertisers, Please Mention Motor Age.



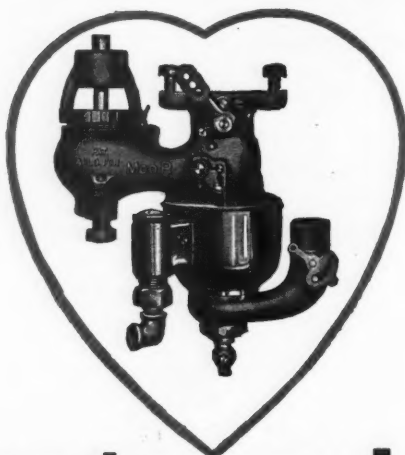
REO ACCESSORIES CO....1220 Michigan Ave., Chicago, Ill.
OMAHA RUBBER CO.....Omaha, Neb.
Foreign Branch: HOLLEY BROS. CO....Coventry, England
Holley Carburetors are carried in stock at the following addresses:

CHAS. E. MILLER,
Home Office: 97-103 Reade St., and 121 Chambers St., New York

BRANCHES:

New York City...924 Eighth Ave., between 54th and 55th Sts.
New York City...2782 Broadway, between 107th and 108th Sts.
Springfield, Mass.....Bridge and Dwight Sts.
Hartford, Conn.....274 Trumbull St.
Atlanta, Ga.....66 Edgewood Ave.
Brooklyn, N. Y.....1421 Bedford Ave.
Buffalo, N. Y.....824 Main St.
Albany, N. Y.....135 Central Ave.
Boston, Mass.....202-204 Columbus Ave.
Detroit, Mich.....227-229 Jefferson Ave.
Cleveland, O.....1829 Euclid Ave.
Philadelphia, Pa.....318 No. Broad St.
New Orleans, La.....601-603 Baronne St.
Newark, N. J.....274 Halsey St.

1,500,000 SCHEBLER

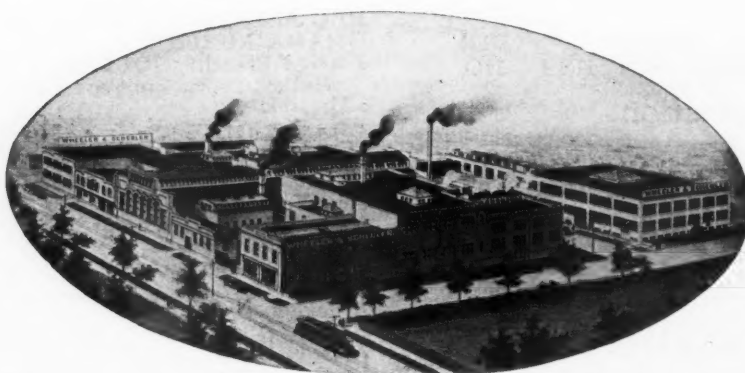


Carburetors In Use!

When a motor mechanic sees a Schebler on a motor he welcomes it as an old friend.

Do you want service and satisfaction? We give service—our instruments satisfaction.

The
Factory
Behind—



The
Schebler
Carburetor

WHEELER & SCHEBLER, Indianapolis, Ind.

"Pioneers in Perfection of Carburetion"

BRANCHES:

Fry & McGill Motor Supply Co.
..... Denver, Colo.
Automobile Accessories Co. Pittsburgh, Pa.
Ferris-Dunlap Auto Supply Co.
..... Dallas, Tex.
Interstate Electric Co. New Orleans, La.
Reinhard Bros. Co. Minneapolis, Minn.

Manufacturers' Supply Co.
..... Philadelphia, Pa.
Weinstock-Nichols Co. Los Angeles, Cal.
Pennsylvania Rubber & Sup. Co. Cleveland
Wheeler & Schebler Chicago
Wheeler & Schebler Detroit

Fred Campbell St. Louis, Mo.
W. J. Connel Boston, Mass.
Equipment Co. Kansas City, Mo.
Elyea-Austell Co. Atlanta, Ga.
J. C. Nichols New York City
Weinstock-Nichols San Francisco

Fairbanks, Morse & Co., Ltd., London, England
Canadian Fairbanks-Morse Co. (All principal Canadian Cities)

When Writing to Advertisers, Please Mention Motor Age.

BUT a small percentage of electric "vibrator" horns made today are sold to *motorists*.

The big market for "vibrator" horns is among *car makers* who are seeking to supply the car-buyers' demand for a push-button signal in the cheapest possible way.

In other words, motorists who are using "vibrator" horns are doing so because they "*came with the car*"—rarely because they chose them or bought them.

The Klaxon is regular equipment on 73 different makes of cars—every high-priced car made. But this represents *less than 10% of all the Klaxons in use*.

90% of the **300,000** Klaxons in service have been bought by **MOTORISTS** to replace inadequate signals supplied by car manufacturers

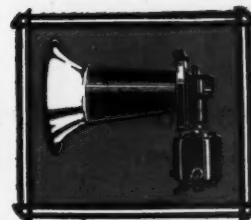


KLAXONET

Lovell-McConnell Mfg. Company Newark, N.J., U.S.A.

KLAXON

"The Public Safety Signal"



KLAXON

INCREASE YOUR



ACCESSORY SALES

The New 1914 Edition of
THE AUTOMOBILE BLUE BOOK

Install a supply and get motorists in the habit of coming to your place for road information. Each sale of a Blue Book means the sale of accessories for the tours to follow.

First Shipment to Dealers by April 25th

Over two months earlier than last year. Hundreds of tour enthusiasts will buy the new book for their early Spring trips.

To insure a supply on hand as soon as your competitors, write the nearest office for sales proposition. Liberal dealer discounts. Effective co-operation.

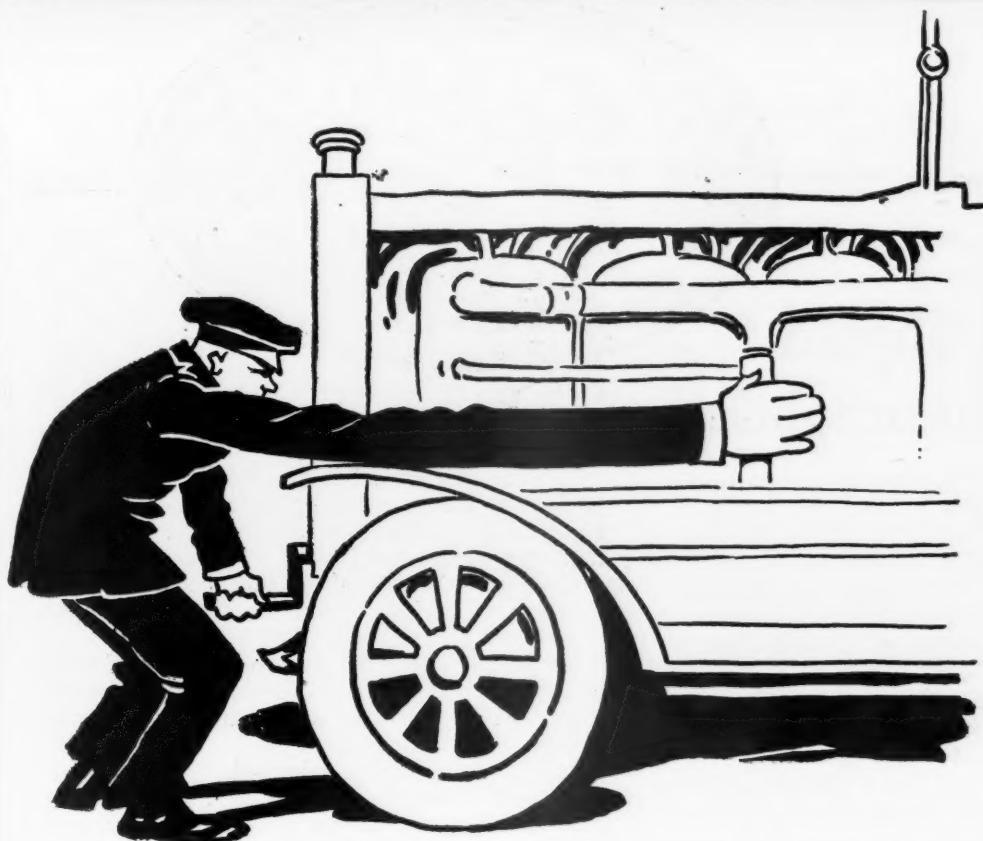
The Automobile Blue
 910 So. Mich. Ave., Chicago

Book Publishing Co.
 2160 Broadway, New York

INCREASE YOUR



ACCESSORY SALES



**They Tell
You to
Hold Your
Hand
Over the
Air In-Take
When You
Crank in
Cold
Weather**

You could do so if you had a six foot arm, but why bother when nearly all cars today are equipped with Electric Crankers?

Before the introduction of self starters expedients of all sorts were necessary for starting refractory engines, but now the enjoyment of automobiling is enhanced a hundred-fold by the elimination of the chief difficulty which formerly beset the car owner.



Storage Batteries

have proven the main factor in the development and perfection of Electric Starting and Lighting.

Without the **GLBA** Battery, constantly up-to-the-minute, in fact, always a little ahead of the procession, electric starting equipment would still be in the experimental stage.

Car manufacturers realize the truth of this. That's why over 100 of them indorse the **GLBA** and use it as standard in preference to all other storage batteries.

GLBA Willard Storage Battery Co., Cleveland, Ohio **GLBA**

New York Branch: 136 W. 52nd St.

Chicago Branch: 2241 Michigan Ave.

Detroit Branch: 736-740 Woodward Ave.

San Francisco Branch: 243 Monadnock Bldg.

Indianapolis Branch: 438 and 439 Indiana Pythian Bldg.

SERVICE STATIONS IN ALL PRINCIPAL CITIES IN THE UNITED STATES, CANADA AND MEXICO.

(96)



How much Should an automobile weigh?

Suppose that railroads should offer you as an inducement to trust your life in their hands, the argument that the weight of their rolling stock had been reduced to the lowest notch.

Suppose in the locomotive, they make the boiler wall so thin and so light, that it will barely withstand the normal pressure for a limited time.

Suppose they make the trucks, the wheels, and the axles barely strong enough to support the engine under the most favorable conditions.

Suppose they make the connecting rods barely strong enough to turn the wheels.

Then, going back to the cars, suppose they make the trucks, the wheels and the axles no stronger than just enough to carry them a few thousand miles.

Suppose they make the frame barely strong enough to support the body of the car.

Suppose they make the body barely strong enough to hold together.

Suppose they reduce the weight of every vital part to the lowest point.

Would you trust your life in the hands of a railroad which offered you such inducements?

Safety demands strength.

Strength demands material.

Material means weight.

If these be true, then:—

Absence of weight must mean absence of material.

Absence of material must mean absence of strength.

Absence of strength must mean absence of Safety.

These things apply, whether you have in mind railroads or automobiles.

How much is your safety worth?

Cadillac materials are selected for their adaptability and fitness for the functions and duties which they must perform.

The designs of the various parts are adopted only after they have proven themselves to embody liberal factors of safety.

The Cadillac car will appeal to you because of its strength and its security, rather than upon the basis of lightness.

The Cadillac will appeal to you for its comfort as the luxurious Pullman appeals to you in contrast with the light weight flimsy coach.

The Cadillac will appeal to you for its smoothness and steadiness in running, as the majestic liner is in contrast with the light weight barque in a choppy sea.

The Cadillac will appeal to you because of its sturdiness and its endurance, rather than upon the basis of fragility and impermanence.

Because of its strength, because of its enduring qualities, the Cadillac is an economical car to own and to operate, day-in-and-day-out and year-in-and-year-out.

The Cadillac is economical in fuel.

Hundreds of 1914 Cadillac users are averaging from 15 to 18 miles per gallon of gasoline in every-day service.

Special test runs have been made showing more than 22 miles per gallon, but this cannot be taken as a criterion for the average user.

In the recent test by the Royal Automobile Club of Great Britain, which won for the Cadillac the Dewar Trophy, the 1914 car averaged 17.17 miles per gallon for 1000 miles over give-and-take roads—in spite of frequent stops and starts in testing the electrical cranking device.

It consumed less than one gallon of lubricating oil in traveling the 1000 miles.

Hundreds of users are averaging more than 5000 miles on tires. Some users are reporting from 6000 to 8000 miles and even more.

We believe that in tires, fuel and oil, the 1914 Cadillac will average more mileage than any car which approaches its efficiency.

Because of its standardization, because of the interchangeability of its parts, because of its sturdiness, because of its endurance, the Cadillac has been called, The Everlasting Car.

That this appellation is merited, we need but point to the 75,000 Cadillacs produced, all of which to the best of our knowledge are still doing duty, the oldest after eleven years of service—and many of them after having passed the 100,000 mile mark.

How much should an automobile weigh?

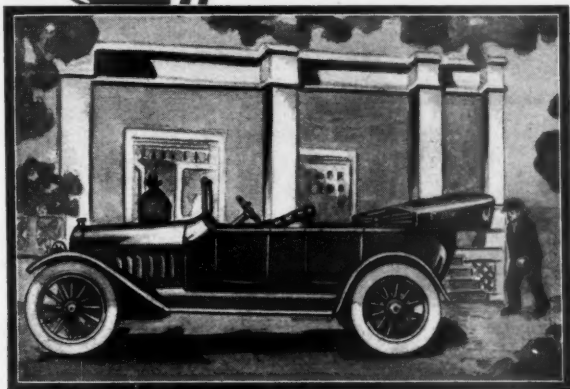
It should weigh enough to enable it successfully to perform the duties required of it.

It should weigh enough to enable it successfully to perform those duties day-in-and-day-out and year-in-and-year-out, at a minimum outlay for operation and maintenance,—performance and satisfaction considered,—and with a minimum depreciation in value after years of service.

CADILLAC MOTOR CAR CO., DETROIT, MICH.

When Writing to Advertisers, Please Mention Motor Age.

GASOLOCK YOUR CAR



If you leave your car unprotected minutes

Gasolock Service

With the Gasolock you receive two Yale keys. A third key is filed away in our office under your number. If you should lose one or both of your keys, a telegram sent us collect will bring the third key under special delivery without cost to you. This is part of our service to our customers.

The Gasolock is equally valuable on cyclecars, motor boats or motor trucks. It is carefully made and comes in several lengths to suit conditions of installation and each length can itself be extended. When ordering, merely give make and model of car. The life of the Gasolock knows no limit as the wear is practically negligible and is rigidly guaranteed. It can be taken off your old car and fitted to the new one at any garage. And it is an ornament on any car—one well worthy to take its place among the finest of equipments.

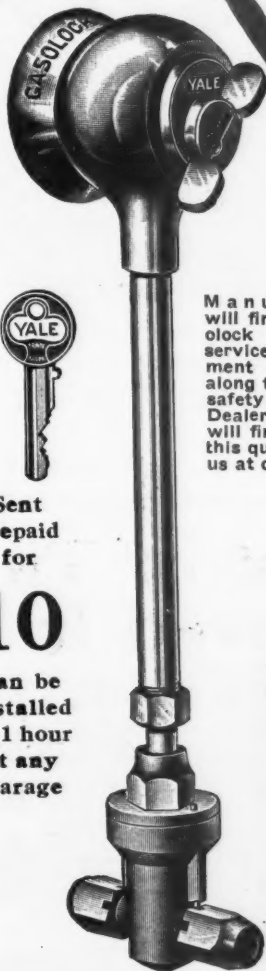
Over 1,000 Gasolocks are in use in Detroit. You need the Gasolock protection. It is insurance of the highest order because it guarantees possession. Why not enclose your check or money order and ask for one? It will go forward immediately.

Headlight Support Co.

Mfg. Auto Devices

1222 Dime Bank Building
DETROIT, MICH.

Consul representative,
E. C. Lund Sales Co.,
305 Grant Ave., San Francisco, Cal.



Sent
Prepaid
for

\$10

Can be
installed
in 1 hour
at any
Garage

Manufacturers will find the Gasolock a powerful service selling argument and equipment along the right lines of safety to the owner. Dealers and agents will find a big field for this quick seller. Write us at once.

Put the Yale key and lock on your gasoline supply for absolute protection against automobile thieves.

Last year more than 2000 cars were reported stolen and one-third of these completely disappeared. Of the two-thirds recovered the majority were wrecked or badly damaged. Motorists continually leave their expensive automobiles unprotected at all hours of the day and night—a tempting opportunity for the joy-rider and thief. Why should your motor car—representing a considerable investment—be left for its safety to luck alone?

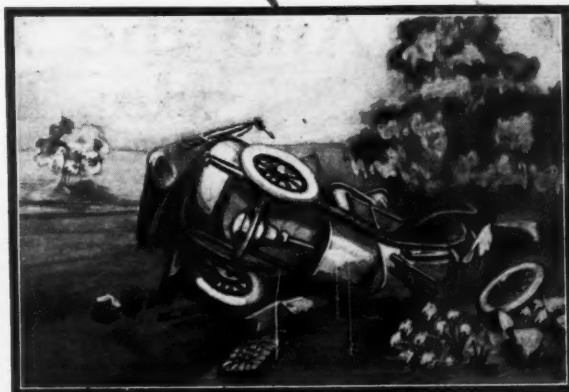
THE GASOLOCK

(A basic patent fully protected)

is the safest and simplest device yet invented to prevent joy riding and auto stealing. It is right before you on the dash—within easy reach—and shuts off the gasoline supply to the motor with a twist of the finger or touch of the foot. Your car remains thief-proof until your Yale key opens the gasoline supply again.

The Gasolock is fitted in a convenient place on your dash and runs down through the floor boards—which can be screwed securely—to the gasoline pipe. Here, in this inaccessible position, the connections are made for the shut-off valve and fastened down so that it is very difficult to tamper with them. It is impossible to unlock the Gasolock by force. It may be bent or twisted or broken yet the gasoline pipe remains closed and the car safe—proven in a hundred actual cases. The Gasolock is a great saver of gasoline. Every carburetor will leak at intervals and leave a puddle of gasoline beneath it on the road or in the garage—waste which should be stopped. The Gasolock prevents this and its attendant danger of fire and explosions.

Besides this saving in gasoline add \$7.50 for automobile insurance against theft—not needed with the Gasolock. Then add your peace of mind in feeling free to leave your car anywhere without worry. Add the great annoyance to your plans should your car be stolen. Add the fire hazard from possible back explosions, the owners' liability, and many more items which are possible and of daily occurrence. That is why the Gasolock pays for itself many times.



You may find it next day in this condition

Another Economy
for Motorists—
Another Trade Winner
for Dealers

Firestone

Red Tubes

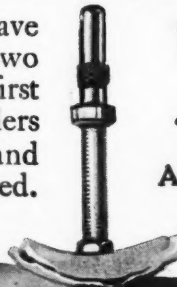
AN inner tube of greater strength, greater density, greater heat resistance and longer life than has ever been produced. Years ago the knowing ones picked the red tube as the right principle. But to get the right "body" and the right cure, using antimony instead of sulphur, as is necessary—this was a baffling piece of work.

But the Firestone Specialists solved the problem—as usual. Pure para of finest grade with "just enough" antimony to accomplish the right "handling" and insure maximum heat resistance.

It's in the making—in the "baking"—and every other step of production, with the usual Firestone good measure of best rubber.

And the Test of Time Has Proved It

Wherever Firestone Red Tubes have been introduced during the past two years, they have won first place the first season over all—reds and greys. Dealers are enthusiastic over the bigger value and price-satisfaction for all concerned. Write for particulars.



**The Firestone Tire
& Rubber Co.**

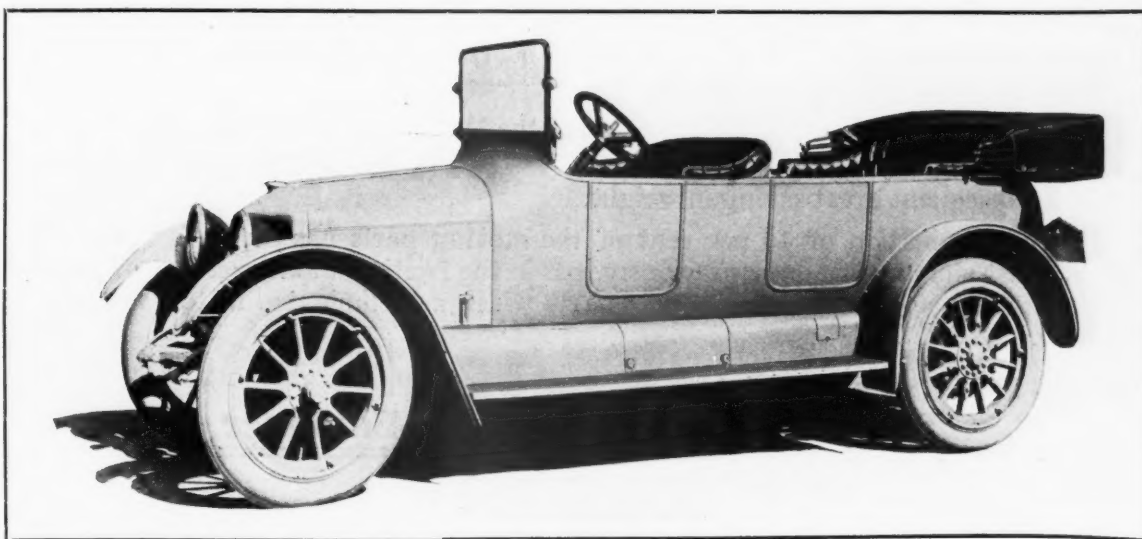
*"America's Largest Exclusive Tire
and Rim Makers"*

Akron, Ohio — All Large Cities

Pneumatic Tires, Truck Tires, Pleasure
Electric Tires, Carriage Tires, Cycle Tires, Fire
Apparatus Tires, Rims, Tire Accessories, etc.

Two Days

Ending the Day of Extravagance
Beginning the Day of Economy



New Series

With an account of the Triumph of the
PREMIER-WEIDLEY 6 cylinder auto-
mobile in solving the most serious problem
of the automobilist—the cost of operation.

Premier Motor Mfg. Co.
Indianapolis, Indiana

On the First Day That a Premier-Weidely 6 Cylinder Automobile Returned Triumphant From a Most Severe Road Test, a New Day Had Arrived in Advanced Automobile Engineering Construction

The comparison between the Weidely motor and the ordinary 6-cylinder poppet valve engine may best be made by considering the position of the reciprocating steam engine with its great flywheel and crankshaft and the modern steam turbine on the day that the turbine proved its efficiency.

The Weidely motor makes it possible to save piston produced power that is ordinarily absorbed in rocker-arms, springs and roller push rods, and give it to the wheels.

The Weidely motor gains power through simplicity of design. Placing the cam shaft at the head of the motor and bearing directly on the valve head has proved to be a remarkable aid to motor efficiency.

The 3 $\frac{5}{8}$ -inch bore of the cylinders in the Weidely motor by actual test produces more power than the larger bore of a heavier, more costly to operate engine, with a consequent great saving in weight.

The elimination of 40 per cent of the moving parts has saved for propulsion a vast amount of power previously lost in the friction and movement of push rods, springs and other interlocking parts which are eliminated in the Weidely engine.

The Day of the Economist-Engineer Has Arrived

George Weidely, the Economist-Engineer, who designed this motor, knew and foresaw the necessity for refining and simplifying the automobile gasoline engine.

He had seen the single cylinder car develop into two cylinders, and the two cylinders jump to four, then to six, which, it is generally admitted, marks the limit of efficient cylinder multiplication. He foresaw the opportunity for engine improvement through simplification of design with resultant greater efficiency, reduced weight and size, more flexibility, increased stamina.

He knew that every moving part in a motor had in it latent trouble possibilities. Every experienced motorist knows this. He also knew that trouble possibilities naturally decrease with the reduction in engine parts.

Reduce parts and you remove a barrier to maximum power production and correspondingly improve the mileage per unit of fuel consumption; reduce weight and you increase tire mileage, with the result that the Premier-Weidely is today in a class by itself among self-propelled gasoline cars and is at least two years in advance of the industry.

Operating Economy in Automobiles **Had To Come. It Arrived With the** **Premier - Weidely 6 Cylinder Car**

It was inevitable that progress in motor engineering required simplification of the standard poppet valve motor, which was unnecessarily complicated. Much power developed in the cylinder was lost in the multiplicity of push rods, bearings and springs—all these meant added friction—friction not alone absorbs power but necessitates lubrication—and then there was the added weight.

To gain greater usable power on less fuel; to save weight, thereby reduce stress, and wear on tires; to remove the source of engine trouble and thereby lower expense of repairs—that was the task and its successful accomplishment is demonstrated in the speed-noiseless control and flexibility of the Premier-Weidely 6-cylinder car—THE CAR OF TODAY AND TOMORROW. It leads the industry and has created a new and higher level of mechanical excellence, to the advantage of the motorist and the industry.

The Premier-Weidely Was The **Sensation of the Recent Shows**

Manufacturers, engineers, dealers, men who report the news of the industry, said to one another—"Have you seen that Weidely motor? It's the biggest thing in the show."

It was the biggest thing at the show. IT IS THE GREATEST THING IN THE AUTOMOBILE WORLD TODAY. The PREMIER-WEIDELY automobile gives to the buyer of a new car the opportunity to anticipate automobile design developments by at least two years. The Premier controls the Weidely design. This simple, effective, wonderfully clean, compact engine will be found in no other car made in America.

The PREMIER-WEIDELY gives the experienced motorist a new thrill when he presses the foot lever. The simple, noiseless, never-failing operation of this motor, designed on the most advanced lines, adds another element of enjoyment to the driver of *his* car. The car will start, run and stop with a degree of instant responsiveness of ease and manipulation not to be found in any other car. He may further enjoy the comforting satisfaction that under his control is the most efficient motor, more power—less weight—greater flexibility and very much lower operating expense.

The owners of Premier-Weidely Sixes will retain all the values of Premier—quality, service and dependability, and gain the added power of greater economy of the Weidely motor.

The combination is the biggest and best purchase that the careful motorist can make today.

The record of the Premier for dependability is unmatched—the tour of twelve Premier cars from coast to coast on a time and record schedule that remains unmatched and is a landmark in the history of the automobile industry—Premier car service day in and day out—winter and summer—on rough roads and smooth, is the record that we are proud of.

Now comes the Premier-Weidely Six—a car that marks the beginning of a new day in motoring cost, a new day in motor engineering and construction.

The Premier-Weidely Six will make new records—men who drive automobiles and count the cost will observe carefully the operation of this great car, they will give it the supreme test of service—and performance. That's the test we want you to give to this automobile for we know what it can do, and we want the world to know.

The best advertisement that the Premier-Weidely Six is going to get will be the enthusiastic comment of the “men from Missouri.” The “show me” chaps who will try out this car in a way that few cars have ever been tried and we cheerfully await their verdict.

We have got the car of this year and next.

The Premier-Weidely Six is the Car That Produces Maximum Power at the Wheels and Takes the Pressure Off the Purse

It is the car for the economical motorist who knows that very low first cost may mean very high operating cost—and that operating cost is important first, last—all the time.

The Premier-Weidely Six is class all over—with its advanced engineering goes extreme refinement in body design, outline and finish—a handsome, up-standing car, perfectly proportioned, rightly balanced, with upholstery and appointments of the best—The car rides easily—the spring construction is of the most approved type—

Men who know how to build perfect automobiles built this car and they did their best work on the Premier-Weidely Six.

The Price is \$2,700.

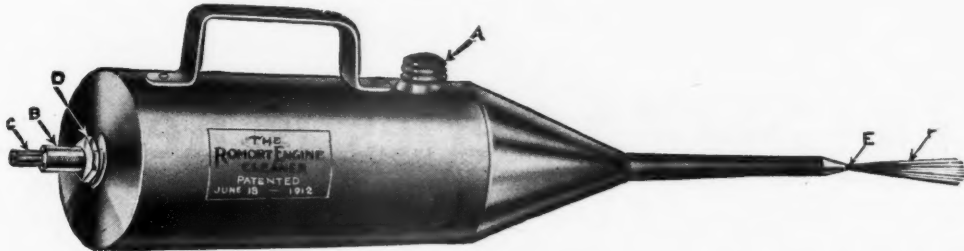
Why not own the real automobile this year?

We will gladly answer any inquiries from automobilist or dealer—

Premier Motor Manufacturing Co., Indianapolis, Ind.

Efficiency and Economy

Are what you demand of your engine. A few moments devoted to reading this will tell you how to obtain both. THEN IT IS UP TO YOU



The Romort Engine Cleaner

AN accessory absolutely indispensable to automobile and motorcycle owners, chauffeurs, garage and repair shops. Sustains your car efficiency by keeping the machinery bright and new. Cleans the engine and machinery perfectly without the use of rags, waste or brush. Designed for the special purpose of cleaning automobile and motorcycle engines and machinery, it is constructed with a long spout or point, so the operator may easily reach every nook and part of the machinery, an impossibility with the old method of rags and waste. The dirt and grease readily disappear before a strong spray, which works under very low air pressure. Use a foot-pump, air bottle, engine driven or spark plug pump, garage storage systems or in fact any air pressure system from 10 pounds to 200 pounds. It cleans the machinery of your automobile or motorcycle just as readily and with the same result as one would hose off the outside of the car. The Romort Engine Cleaner, one quart of coal oil and five minutes of your time will do the work.

Avoid the Danger

Of Explosions, Fires, Worn Parts; Short Circuits and Fatal Accidents Caused Directly by the Accumulation of Dirt and Grease—Use

The Romort Engine Cleaner

Guarantee—Read This

The Romort Valve Company guarantees this Cleaner to do the work and stand ready and willing to replace anything found defective, and will cheerfully refund the purchase price on each and every Cleaner proving unsatisfactory.

Delivered by Parcel Post or Express. Price Only \$3.00 Delivered.

The Romort Valve Co.

Manufacturers

701 E. Pike St. SEATTLE, WASH.

Price

\$3.00

Delivered—

For sale by all
leading Dealers
or order direct.

See
coupon below

Description.

The Romort Engine Cleaner is 20½ inches long by 4 inches in diameter, a convenient size for carrying in a car. Fluid capacity, two quarts (common coal-oil preferred); this quantity is sufficient to clean the largest engine. Weight, 1¼ pounds. Construction is very simple, there being absolutely nothing to wear, or get out of order. Finish, black.

How to Operate.

Fill the tank as shown in the cut at letter "A," attach the cleaner to hose or air supply at letter "C" (standard connection will fit any air hose). Turn knurled rod at letter "B," which opens valve and lets fluid out at letter "E," fluid is forced out in a very strong spray, as shown by letter "F." Light or heavy spray is regulated by a slight turning of knurled rod "B." The packing nut, as designated by letter "D," may be easily detached and repacked if found necessary.

No Danger of Exploding.

As the air does not enter the tank, but passes right through, picking up the fluid at letter "E," there is absolutely no danger of the tank blowing up—this being impossible.

Fill out and mail this Coupon. Your order will have our prompt attention.

THE ROMORT VALVE COMPANY
701 East Pike St., Seattle, Wash.

Gentlemen: Inclosed find three dollars, for which please send by parcel post, prepaid, subject to your guarantee, one Romort Engine Cleaner.

Name

Address



The Spring Series is Ready

WE first began building Stearns cars with the sleeve valve engine some four years ago, and have built more cars each year since then than in all the previous years we have been in business.

The present season is no exception to this rule of steadily increasing sales, and the Spring series, **now ready for delivery**, is so designed and made that it will not only maintain, but improve this record.

The Stearns (^{Knight}_{Type Motor}) is a "Several Year" Car

The new series models, which will remain unchanged throughout the coming season, are by far the most scientifically designed, carefully made and beautifully finished cars the world has ever seen. To possess one is to have the maximum in motor car construction, acknowledged the world over.

Sixteen Models—\$3750 to \$6200

Four and Six Cylinders

THE F. B. STEARNS COMPANY
CLEVELAND, OHIO

Ford Dealers!

If you have not received
our big inducement propo=
sition on our new
"FORD=SPECIAL" Stewart
Speedometer, then telegraph
our nearest Branch Office
TODAY!

Stewart-Warner Speedometer Corporation

Executive Offices: 1931 Diversey Boulevard, Chicago

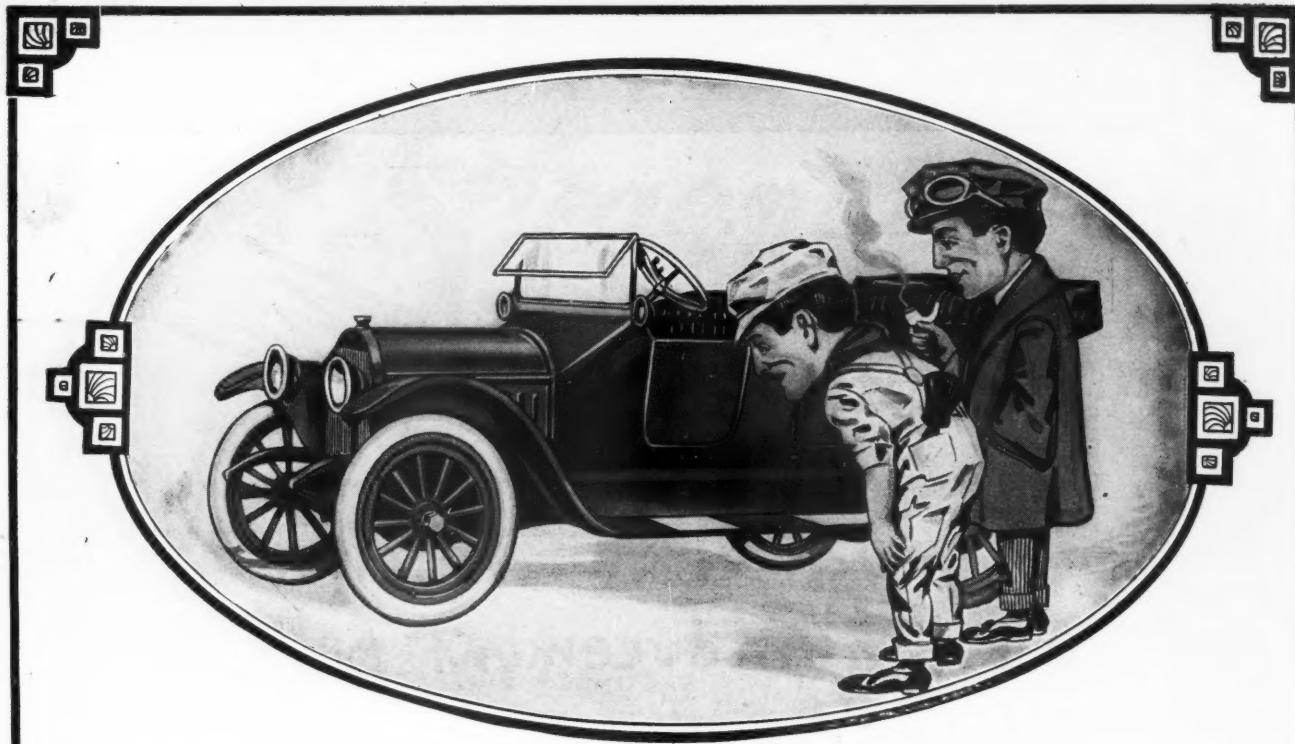
Factories: Chicago and Beloit, Wis.

Branches:

Atlanta, Ga., 399 Peachtree St.
Boston, Mass., } 1111 Commonwealth Ave.
 } 8-10 Brighton Ave.
Buffalo, N. Y., 720 Main St.
Chicago, Ill., 1312 Michigan Ave.
Cleveland, Ohio, 1831 Euclid Ave.
Detroit, Mich., 1235 Woodward Ave.
Indianapolis, Ind., 514 N. Capitol Ave.
Kansas City, Mo., 1825 Grand Ave.

London, England.
Los Angeles, Cal., 115 East 10th St.
Minneapolis, Minn., 635 Third Ave., S.
New York, N. Y. 243 W. 58th St.
Paris, France.
Philadelphia, Pa., 608 N. Broad St.
Pittsburgh, Pa., 301 N. Craig St.
San Francisco, Cal., 1447 Van Ness Ave.
St. Louis, Mo., 3333 Olive St.

Service Stations in all cities and large towns



"All these months of hard usage haven't dulled it a bit."

"The reason for this, Sir, is that I finished it with Valentine's Automobile Painting Materials. They keep a car looking new for many months."

"Note especially the hood and fenders of your car. We put Vanadium Chassis Finishing on them. This varnish is not affected by soapy water washing, mud spotting, road oil and the other evils that attack the finish of the chassis. With other varnishes the hood, fenders and wheels look dull in a few months."

For the body of the car—Vanadium Body Varnish.

For the hood, fenders and under parts—Vanadium Chassis Finishing.

Ask your painter to use them.

Write for our booklet, "The Care of the Car".
It tells how to keep your car new.

VALENTINE & COMPANY

Largest Manufacturers of High-Grade Varnishes in the World

456 Fourth Ave.
NEW YORK

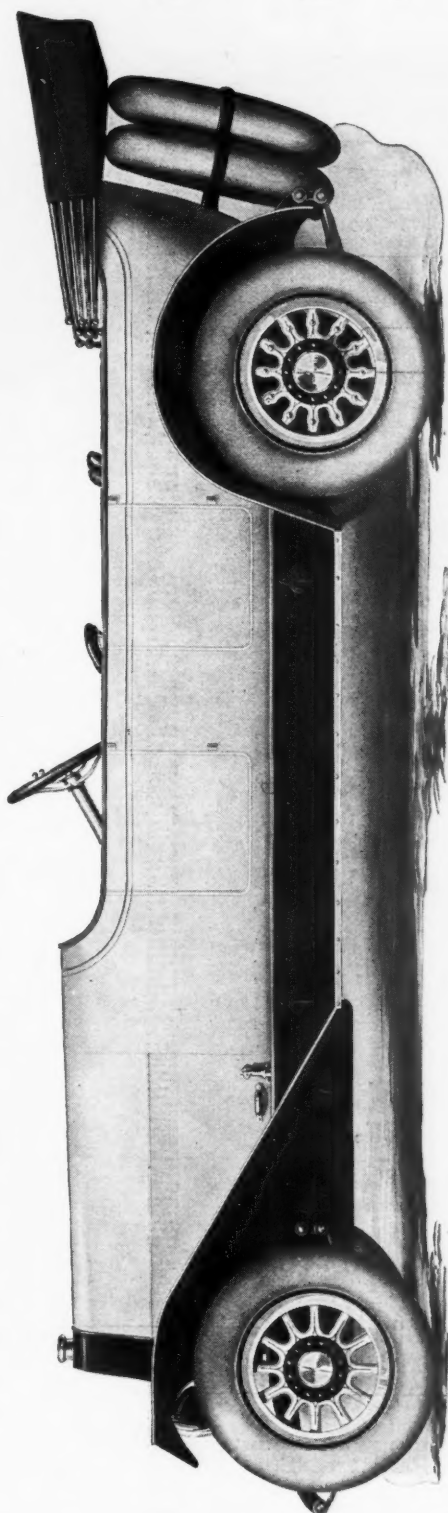
74 Pearl St.
BOSTON

343 S. Dearborn St.
CHICAGO

FILL IN—TEAR OFF—MAIL TODAY
VALENTINE & COMPANY, 456 Fourth Ave., New York
 Check here Owner... Garage... Paint Shop... (M.A.)
 Name
 Address
 Please send me free copy
 of your booklet, "The
 Care of the Car".

TRADE **VALENTINE'S** MARK
VARNISHES

THE AUTOMOBILE SENSATION OF 1915



\$1850

Fully

Equipped

\$1850

Fully

Equipped

THE RICHARD

96 Horse Power

80 Miles an Hour

Goes 26 miles on gallon of gasoline.

Takes 10 to 15 per cent grade on high speed at 50 miles an hour, geared two to one.

Throttles down to five miles in high speed.

Only car in America with *real* long stroke motor.

Four cylinders with four inch bore and 8 15-16 stroke.

Rated at 25 H. P., developing 96 H. P.

Only stock car ever made that will use either gasoline or kerosene.

128 inch wheel base.

Seven passenger touring car body.

Magnetic electric starting and lighting system.

Transmission and all other parts designed and built to take care of **120 horse power.**

Designed by Francois Richard, the famous French engineer.

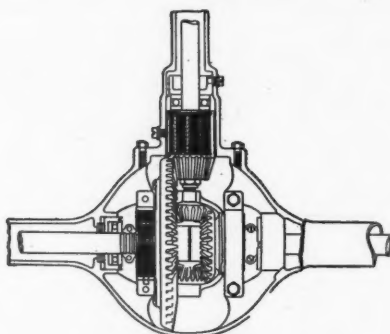
LIVE AGENTS WANTED

Write or telegraph for territory and details. Five year contract. No deposit required. Delivery in July

The Richard Auto Manufacturing Company

1032 Engineers Building

CLEVELAND, OHIO



Hyatt Bearings used in Rear Axle

You know that the bearings in the rear axle of your car must stand a lot of severe service—in addition to supporting the driving mechanism of the car, the axle in which they are mounted is continually bumping up and down all over the road.

And it is the road shocks and strains that cause most of the axle trouble.

Solid roller and ball bearings tend to transmit these shocks to the gears and shafts, while Hyatt Roller Bearings relieve the surrounding mechanism of undue strains by cushioning shocks, absorbing vibrations and carrying the load on a "full line of contact."

The "Hyatt Quiet" is the only bearing that has these advantages.

Two books, one about motor car bearings in general for prospective purchasers, the other for automobile owners, will be sent on request.

"Hyatt Quiet Bearings"

HYATT ROLLER BEARING Co.
DETROIT, CHICAGO
NEWARK, N.J.



**INSIST UPON THE
RED TAG**



**ACCEPT NO SUBSTITUTE
FOR
PLATINUM POINTED
Mosler
Spit Fire
Plugs**

**Genuine Platinum Point
Guaranteed Forever**

Energetic Ignition

Greater Power

A. R. MOSLER & CO.

P. O. Box "M," MT. VERNON, N. Y.

These Tires Alone

—are guaranteed not to skid on wet or greasy pavements, else returnable at full purchase price after reasonable trial.

—are guaranteed for 4,500 miles *actual* service for the user's protection only on the basis of years of proof that this figure is a *low minimum*.

—are guaranteed to be absolutely oilproof—immune to the effects of oil on roads, garage floors, or otherwise encountered.

PENNSYLVANIA Oilproof VACUUM CUP TIRES

No user has ever challenged the non-skid guarantee.

Purchasers should always figure on the great excess mileage (above the guarantee) averaged by these tires, many records exceeding 12,000 miles on heavy cars.

The Oilproof feature is invaluable, and eliminates much worry and inconvenience.

*Start 1914 on VACUUM CUPS
Dealers Everywhere*

Pennsylvania Rubber Co., Jeannette, Pa.

New York
Chicago
Cleveland

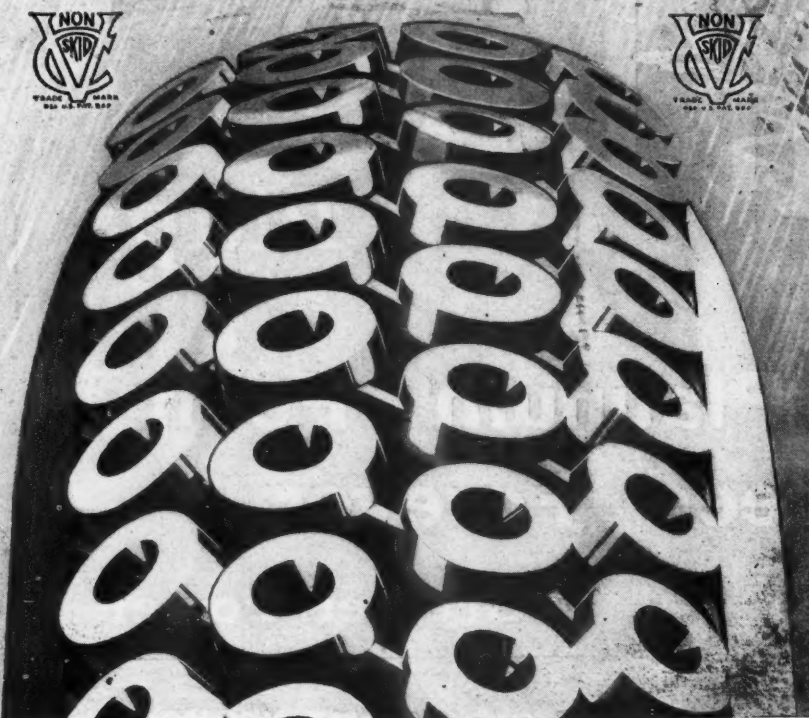
Boston
Pittsburgh
San Francisco

Los Angeles
Detroit
St. Paul

Minneapolis
Omaha
Kansas City, Mo.

Seattle
Dallas
Atlanta

An Independent Company with an independent selling policy



What's Happening?

When we released our Spring campaign a few weeks ago, we thought we were starting out to gently nudge the tire trade and their good customers into starting some early activities on

PENNSYLVANIA Oilproof VACUUM CUP TIRES

We casually mentioned our trebled facilities of production, and suggested our enlarged ability and undiminished desire to take care of orders.

They Came!

We awakened to a sudden and forceful realization that we were all at once right in the thick of the biggest volume of daily business in our history despite the earliness of the season. Our hopeful expectations of an encouraging response were as nothing compared to the real results. And every mail has brought the orders in increasing flood volume steadily absorbing our output and rapidly cleaning up what little reserve stocks we had been able to build up.

What's Happening Is This!

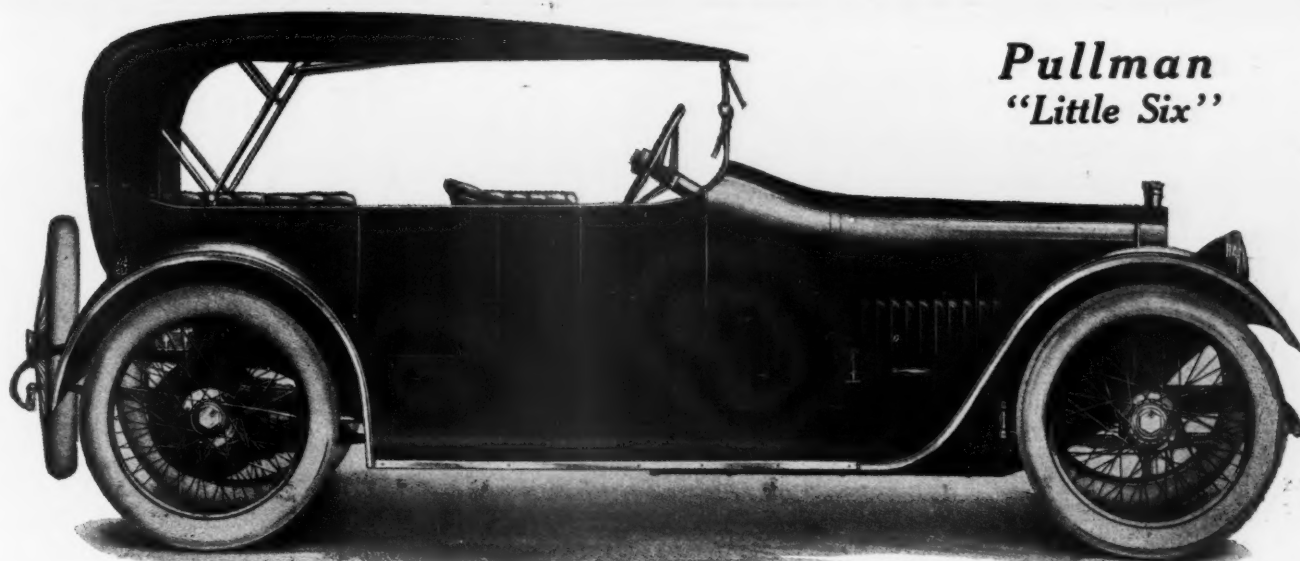
Those who couldn't get Vacuum Cup Oilproof safety and service last year, because of our inability to fill orders, are protecting themselves against disappointment this year—and the far-sighted dealers are scaling their orders up *and getting them in early.*

Pennsylvania Rubber Co. Jeannette, Pa.

New York	San Francisco	Omaha
Chicago	Los Angeles	Kansas City,
Cleveland	Detroit	Mo.
Boston	St. Paul	Seattle
Pittsburgh	Minneapolis	Dallas
		Atlanta

*An Independent Company with an
Independent Selling Policy*

Typical advertisement of the Vacuum Cup campaign running in the Saturday Evening Post and all the prominent weeklies and monthly magazines.



Pullman
"Little Six"

"PUSH THE BUTTON"

Why have you not written us for more particulars about the most distinctive car on the world's market?

You ought also to know about the new **ELECTRIC GEAR SHIFTING DEVICE**. It will make a tremendous hit with the women folks as well as with their brothers.

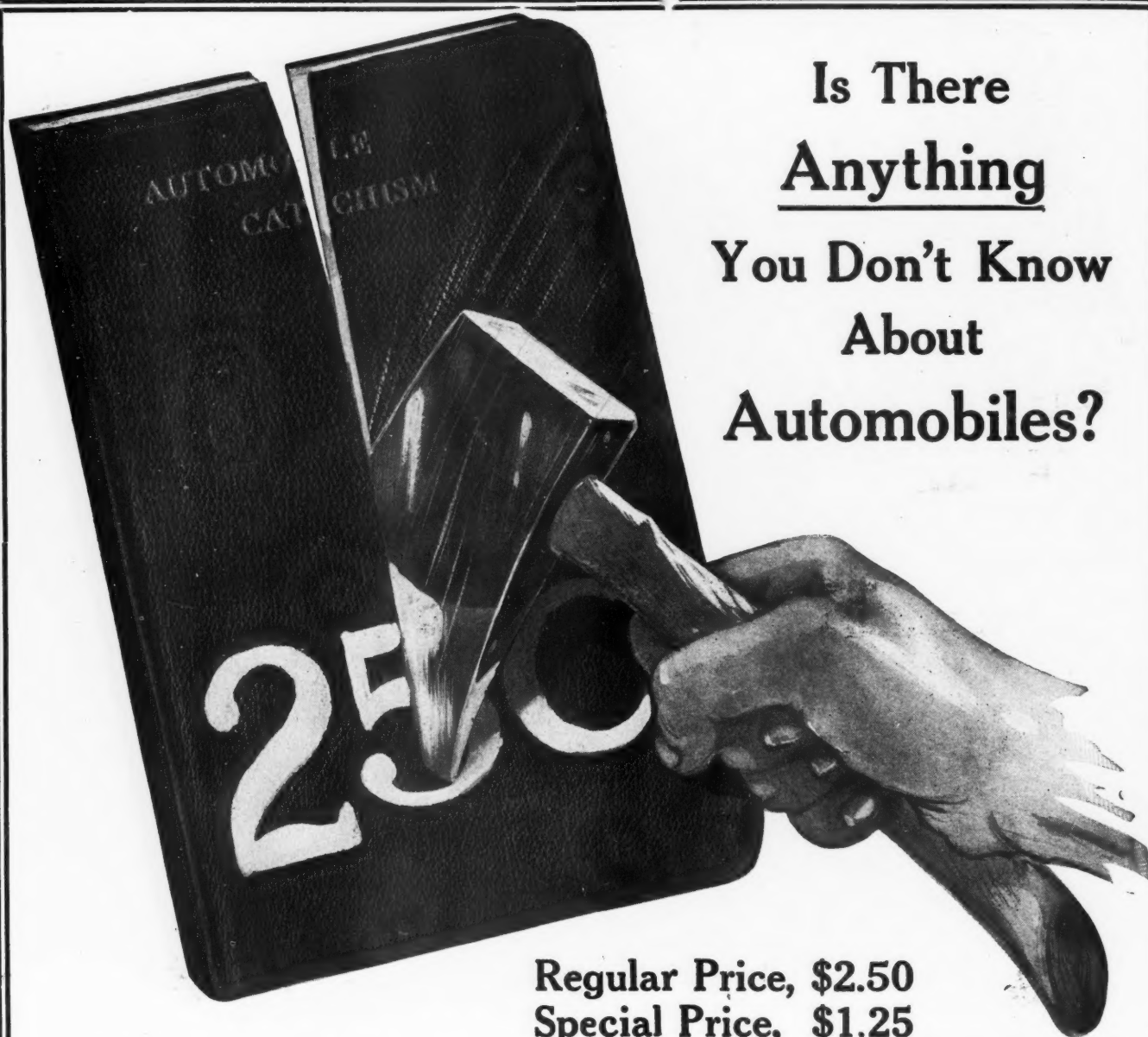
It has been aptly termed the "**PUSH-THE-BUTTON-CAR**." We do not ask the driver to shift gears, start the motor, or do anything but "**PUSH THE BUTTON**." The gasolene and electric current will do the rest.

It has, besides, everything else that a good car ought to have. Of course it has Continental Motor (46.5 H. P.), unit power plant, Mayo Radiator, Stromberg Special, Bosch Dual, Multiple Disc, Westinghouse Lighter-Starter, Tires 36x4½, Power Tire Pump, Vulcan Electric Gear Shift.

Let us tell you more about **THE PULLMAN AUTOMOBILE**.

The Pullman Motor Car Company, York, Pa.

When Writing to Advertisers, Please Mention Motor Age.



Is There
Anything
You Don't Know
About
Automobiles?

Regular Price, \$2.50
Special Price, \$1.25

THE AUTOMOBILE CATECHISM" (de luxe edition) is a complete course in automobile instruction—every subject discussed and illustrated so that YOU will grasp every point worth while—every bit of mystery is made as simple as A B C. You are interested—you are instructed—you are directly benefited. Its information is final.

It's a handsome piece of book work—splendidly printed, with 101 illustrations; flexible black leather binding, rounded corners and gold-edged pages—beautiful, while being intensely practical.

THE
CLASS
JOURNAL
COMPANY

900 S. Michigan
Ave., Chicago, Ill.
231 W. 39th St.,
New York, N. Y.

Gentlemen:
Enclosed please find \$1.25,
for which send me a copy of
"The Automobile Catechism"
(de luxe edition).

Name.....
Address.....

It will be to your immediate financial advantage to acquire an intimate and practical knowledge of cars and their parts. Lack of knowledge is expensive.

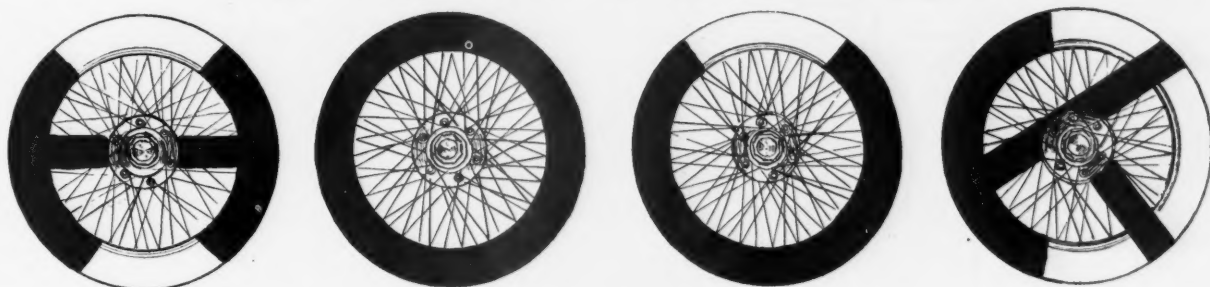
We want every reader of Motor Age to have a de luxe copy of "The Automobile Catechism." To make our offer irresistible we have decided, FOR A LIMITED TIME ONLY, to CUT THE PRICE IN TWO. This half price (\$1.25) will prove the best investment you ever made. Remember, this is the de luxe edition—264 pages—every page full of real, money-interest value.

Put your name and address on the corner coupon, tear from the page, enclose \$1.25 and mail today to—

THE CLASS JOURNAL COMPANY
900 S. Michigan Avenue Chicago, Ill.
231 W. 39th St. New York, N. Y.

The Best Seller of 1914

**The Best Buy for the Motorist
and the
Best Profit Maker for the Dealer**



Detachable

Wire Wheels

Are Sweeping Everything Before Them Because

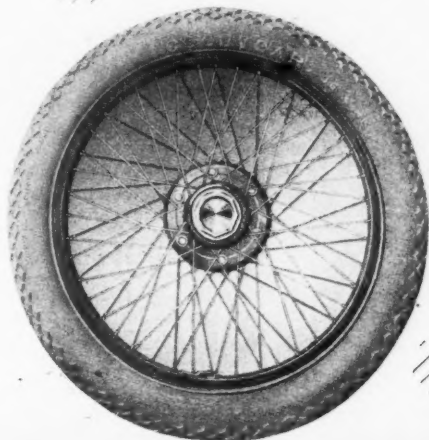
- 1st They reduce tire expense at least 25%
- 2nd They are practically indestructible
- 3rd They make the car ride easier
- 4th They add to the beauty of the car, can be more easily and quickly removed, etc.

Exclusive Agencies are Open for the Best Dealers

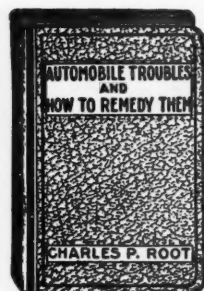
in many localities. Only the highest type of automobile dealer will be accepted, but those that are appointed our agents will receive unusual co-operation from us in the sale of the wheels they contract for. Here is a great opportunity! Every present owner of a car is a prospect, for Houk Wire Wheels are made in sizes to fit all cars, and a set of these wheels can be put on practically any car in an hour. Every purchaser of a new car is a customer ready-made. It is easier to sell him Houk Wire Wheels than not to!

Write us to-day for Proofs and Details of our Proposition

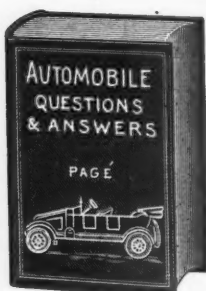
**Manufactured by the Houk Manufacturing Company for
Geo. W. Houk Co. 1705 Elmwood Avenue Buffalo, N.Y.**



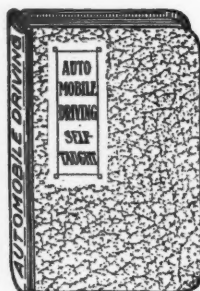
When Writing to Advertisers, Please Mention Motor Age.



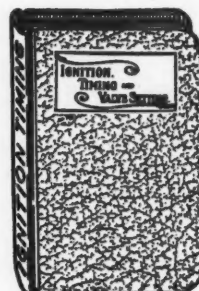
AUTOMOBILE TROUBLES AND HOW TO REMEDY THEM. By Charles P. Root, former editor "Motor Age." Pocket size: 5x7 inches, 252 pages, illustrated, handsomely bound in red flexible leather, round corners, red edges. The only book of its kind published. It not only tells you how to locate troubles and make repairs, but shows you. Price, flexible leather, \$1.50.



QUESTIONS AND ANSWERS relating to automobile design, construction and repair, by Victor W. Page. A practical treatise consisting of a series of 36 lessons, covering some 2,000 questions and their answers. Subject matter is correct and explained in simple language. A feature of this book is the treatment of some of the most important motor ailments, their causes, effects and cure. Price (cloth) \$1.50.

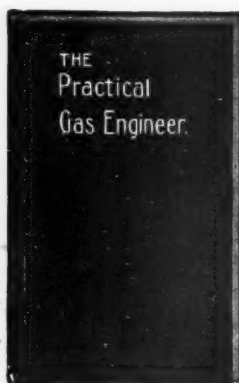
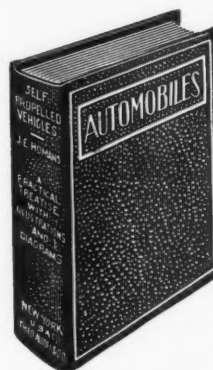


AUTOMOBILE DRIVING SELF-TAUGHT. By Thomas H. Russell, M.E., LL.B. An exhaustive treatise on the Management, Care and Operation of Motor Cars. Pocket size, 230 pages, liberally illustrated, handsomely bound in black seal flexible leather, round corners, red edges. Price, flexible leather, \$1.50.



IGNITION, TIMING AND VALVE SETTING. By Thomas H. Russell, M.E., LL.B. Pocket size, 225 pages, fully illustrated and green leather binding, round corners, red edges. A comprehensive illustrated manual of self-instruction for Automobile Owners, Operators and Repairmen. Price, flexible leather, \$1.50.

SELF-PROPELLED VEHICLES. By James E. Homans, A.M. A practical treatise on the theory, construction, operation, care and management of all forms of automobiles, with upwards of 500 illustrations and diagrams, giving the essential details of construction and many important points on the successful operation of the various types of motor carriages driven by steam, gasoline and electricity. This is probably the best comprehensive treatise published in simple language, so that the contents may be readily understood by the intelligent reader. It is an excellent work to begin with before going deeper into the subject. Size, 5 1/2 by 8 1/2. Pages, 652. With Drawings and Half-Tones. Cloth \$2.

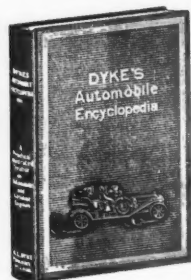


PRACTICAL GAS ENGINEER. By E. W. Longnecker. Twelve years' constant experience with Hydro-Carbon Engines. How to start, how to operate, and how to care for all classes of explosive motors or engines using gas, gasoline or similar fuels. A full and exhaustive chapter on electric and other systems of igniting. Every line tells something. Every page full of interest. A book of 172 pages, neatly bound in cloth. Sent postpaid on receipt of price, \$1.00.

TEN BOOKS that cover the entire automobile field are here offered at from 50 cents to \$3 per copy. Any book mailed postpaid on receipt of price. Order from

THE CLASS JOURNAL COMPANY
910 S. Michigan Avenue, CHICAGO

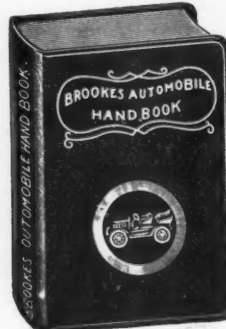
DYKE'S AUTOMOBILE ENCYCLOPEDIA. by A. L. Dyke, E. E. 560 pages. Over 1,000 illustrations. Teaches the Principle, Construction, Operation and Repairing of cars and engines. Covers all valve systems; Ignition; carburetion; care of car; adjusting and repairing; digest of troubles; a good index, which is handy for the repairman. Electric Starting and Lighting Systems; construction, principle, care of and operation. Simplified so any one can understand. Prepared for the novice, but a handy and reliable reference guide for the expert. Price \$3.00.



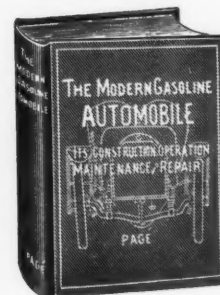
SMALL ACCUMULATORS. How Made and How Used. By P. Marshall. An elementary handbook for students and beginners, discussing theory and practice in the construction of small storage batteries, with instructions for charging and using batteries. Size, 4 1/4 x 6 1/2. Pages, 80. With illustrations. Cloth boards, 50 cents.



THE AUTOMOBILE HANDBOOK. By L. Elliott Brookes. 700 pages and over 320 illustrations. New enlarged edition. Popular edition, full leather limp, \$2.00 postpaid. A work of practical information for the use of Owners, Operators and Automobile Mechanics.



MODERN GASOLINE AUTOMOBILE. By Victor W. Page, M. E. Its construction, operation, maintenance and repair. 700 pages, 500 illustrations. A late and complete treatise on the modern motor car. Free of technical terms, yet complete in every detail. Covers all phases of motor car practice. Price \$2.50.



SAXON \$395

A Good Low Priced Car



Price of \$395 includes Top, Windshield, Lamps and Tools

Everybody Ought to Own a Car Now Everybody Can Own a Car

A good car is an economy—not a luxury. It means saving to the business man—ease in getting about—promptness in making appointments. It means health for himself, his wife and children—health and outdoor recreation. It increases efficiency.

Everybody ought to own a car. Now everybody can own a car—a good car; for the Saxon is a high-grade, well-designed, carefully built automobile, with four-cylinder motor, left drive, center control and standard features throughout, produced by an experienced organization, sound financially and in business to stay.

The first cost of a Saxon is less than a good horse and buggy; the upkeep cost far less. Its maintenance is almost negligible. The tires cost little. A gallon of gasoline takes it 25 miles and more. It is so simple that it scarcely ever needs readjustments or repairs. Saving in time considered, it is cheaper than riding on street cars.

Good—and Good Looking

The Saxon is the answer to the insistent demand for a low priced car that is not only good, but good looking. It is a big car for the price. 96-inch wheel base, standard tread, roomy body, holding two people easily, ample leg room, generous doors. There is nothing skimpy or cramped about it. Molded oval fenders, tapered bonnet, and streamline body with graceful, sweeping curves make it a delight to the eye.

The Saxon is amply powered. The high speed, four-cylinder motor gives

great pulling power and flexibility. It throttles down to five miles an hour or speeds over the road at 40—and without unpleasant vibration or jarring.

To Dealers

The Saxon has already proved itself a wonderful selling proposition. We have shipped over 600 cars. We are now averaging 50 cars a day. We have made good on delivery promises. Territory is nearly allotted—but yours may be still open.

If you haven't already written us, send for Saxon literature.

SAXON MOTOR COMPANY, Department M
DETROIT, MICHIGAN

The More Leaves a Spring Has the Easier Riding It Is

Double the Number of Leaves Your Springs Now Have by Installing

The DANN OIL CUSHION SPRING INSERT



Fig. 1

Strike a solid block of steel with a hammer (See Fig. 1) and the full force of the concussion is carried **directly** through from the upper face of the steel block to the lower face. The shock is practically in nowise dissipated or dampened.

If automobile springs were made of solid steel, road shocks would be transmitted in this same manner **directly** to the car's mechanism and

passengers. A car with solid steel springs would soon shake itself to pieces.

Take this same solid block of steel, however, and split it into 5 separate slabs (See Fig. 2). Then deliver a blow with a hammer. The force of the concussion is **not** carried directly through the 5 components, but is to a considerable extent **dampened**. Each slab "radiates" or "takes up" a certain quota of the shock (note small graduated radiating arrows). The force "carried through" or the ultimate shock is only a fraction of the initial blow.

Naturally the more slabs you split the block into, the less this ultimate shock.

Ordinary automobile springs are built on this component principle. The spring proper is built up of many thin slabs, laminae or leaves. The more leaves the greater the shock-absorbing qualities of the spring—the greater its easy riding qualities.

James Gunn in his authoritative work entitled *The Practical Design of Motor Cars* writes, "A spring which has a comparatively large number of layers which are thin and not highly tempered will give a very much easier motion than one which has fewer plates of greater thickness and of highly tempered steel."

Returning again to our laminated steel block (Fig. 2) suppose that now between each of the 5 component parts (1, 2, 3, 4, 5) we interpose an additional slab or lamina (I, I, I, I), in the shape of a thin strip of ductile metal possessing special shock-absorbing qualities.

Where we had only 5 slabs before, we now have 9. Here the ultimate shock from the hammer blow would be almost **smothered**, on the principle that the greater the number of slabs or laminae, the less the shock that can "carry through." (Dotted arrows show the additional dissipation of shock caused by interposition of Insert I, I, I, I.)

It is upon this last principle that springs equipped with DANN Insert act. By interposing additional laminae in the shape of DANN Insert between the spring leaves, road shock is reduced to the absolute minimum.

DANN Insert being ductile and possessing great shock-absorbing qualities will better the easy riding qualities of any spring simply by doubling the number of its leaves.

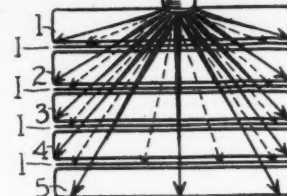


Fig. 2



X-Ray view of spring equipped with DANN Insert, showing how the oil-packed strips of Insert are placed between spring leaves

DANN Insert is a thin perforated strip of specially compounded metal designed to be inserted between the spring leaves from tip to tip. The perforations in the Insert are packed with a heavy lubricant providing perfect and permanent spring lubrication. The spring equipped with DANN Insert has approximately 10,000 oil pockets in its construction. Sample of Insert and descriptive literature on request.

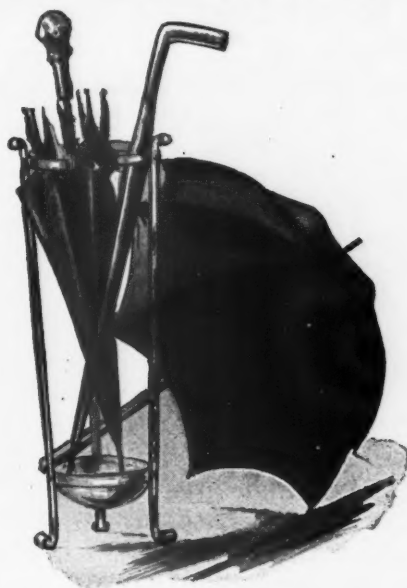
FORD MOTORISTS! The Schaefer Sales Corporation, 1501 Arcadia Building, Detroit, Mich., is prepared to supply Ford owners with DANN Ford Insert—cut to proper lengths, neatly packed in a box, and ready for immediate installation between the spring leaves of any Ford car. Complete instructions accompany each order, making it an easy matter for you or your garageman to "Oil Cushionize" your Ford springs with the utmost despatch.

"Oil Cushionize Your Springs!"

Dann Oil Cushion Spring Insert Company
2252 Indiana Avenue, Chicago, Illinois

The Insert of 10,000 Oil Pockets

When Writing to Advertisers, Please Mention Motor Age.



Who Ever Heard of a Rubber Umbrella?

THE functions of an umbrella and an automobile top are almost identical. The purpose of each is the same, yet there is no such thing as a rubber umbrella. Is there any good reason why there should be rubber in an automobile top cloth, except as mentioned in our previous announcements that such cloths have been make-shifts pending the advent of a perfect automobile top cloth.

An umbrella is made of one piece, single thickness cloth, free from all chemical compositions, yet it affords complete protection.

Laidlaw Burbank Motor Cloth is one solid piece of cloth free from rubber or artificial leather compounds. There is nothing in Bur-

bank to dry out, crack, decompose, peel, blister or rub off. These weaknesses do and always will exist in rubber interlined or artificial leather surface-coated cloths.

An umbrella is an extremely practical article which opens conveniently and folds compactly, and a good one will give excellent service for years. All because there is nothing chemical about it to be affected by heat or cold or long continued folding.



Laidlaw Burbank Motor Cloth possesses every one of the features and characteristics of a perfect top material, and retains them under the most severe and trying conditions, for a period of time longer than the life of the car.

The Laidlaw Company, Inc.

126-132 West 46th Street

New York, N. Y.

The Athlete of Travel

Highest efficiency is the perfect combination of power and lightness. Power must be in the most compact and economical form; the Gnome aeroplane motor, the sail speed of the yacht, the high power motors in the power boat, or the wiry arms and bodies of the oarsmen. And the craft driven by this power must combine lightness and the strength to stand up under every strain.

The absurd idea that weight and bulk meant power is disproved every day. No one any longer believes it.

We saw this long before other automobile manufacturers were able or willing to make the necessary outlay to investigate and prove, and disregard the precedent of years. Paris sets the pace in automobile manufacture and from Paris direct we took the latest ideas, ideas which mark an epoch in motor car development.

Unlimited capital and long years of experience enabled us to give to the public the new Jeffery. Equipped with a light high speed bloc-type motor, the car combines the qualities of lightness, power, economy, beauty and comfort in the highest degree. *And the price is moderate—\$1550.*

The new Jeffery is the

Athlete of Motor Cars

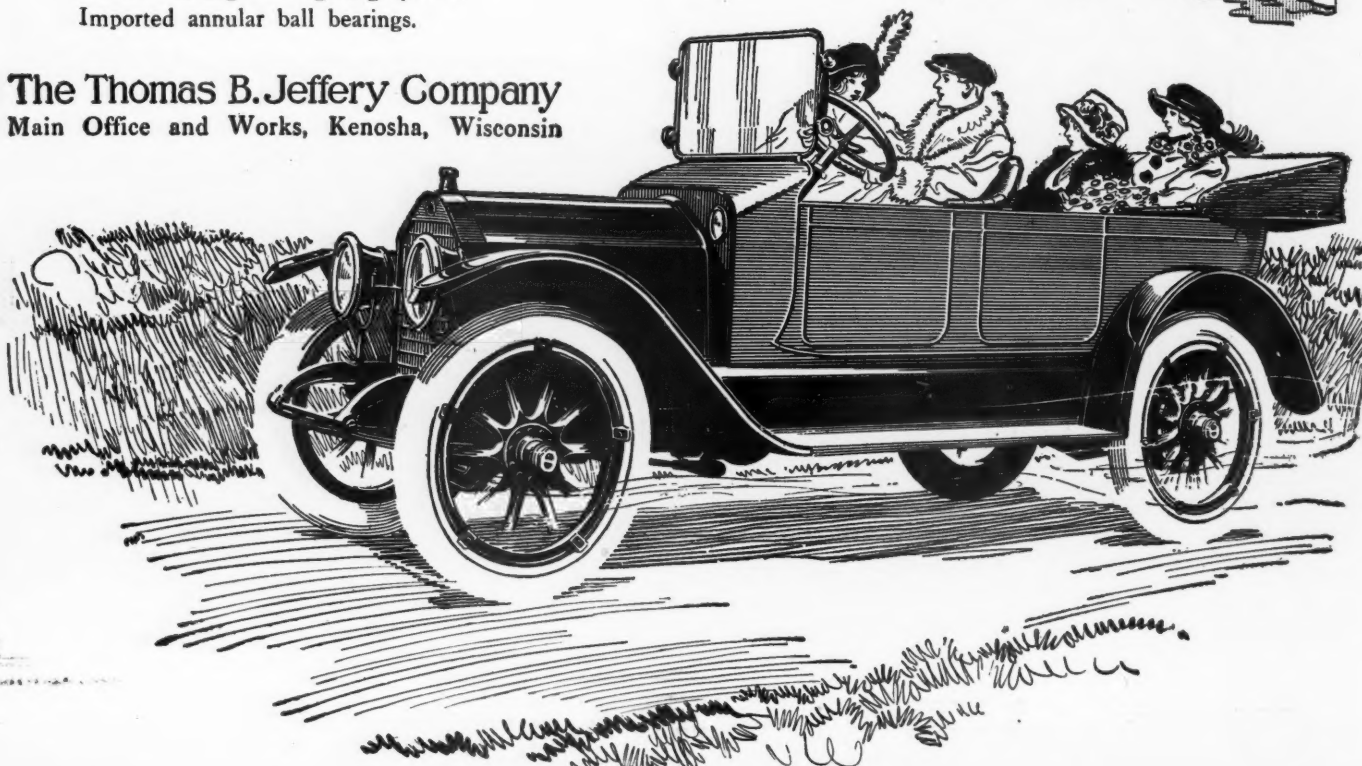
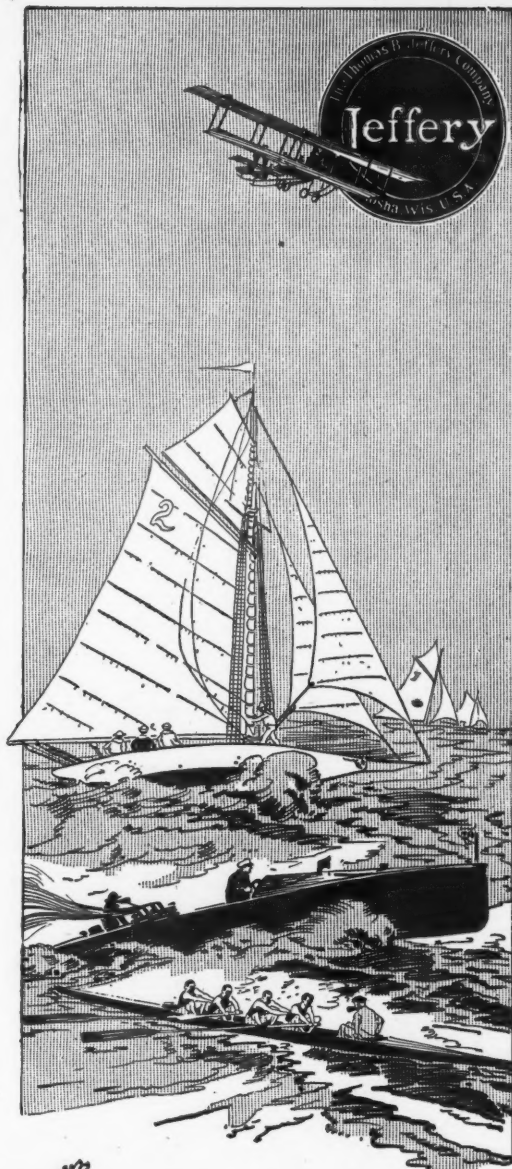
Vanadium steel springs, axles and driving shaft.

Daimler flexible leather couplings, largely eliminating transmission friction.

U-S-L starting and lighting system.

Imported annular ball bearings.

The Thomas B. Jeffery Company
Main Office and Works, Kenosha, Wisconsin



When Writing to Advertisers, Please Mention Motor Age.



SIMPLEX AUTOMOBILE CO.

MAIN FACTORY OFFICES
240 WEST 39th STREET
TELEPHONE: 5198 COLUMBUS
NEW YORK

New Brunswick, N.J.

FACTORY
NEW BRUNSWICK, N.J.

April 2, 1914.

The R.I.V. Company,
New York City.

Gentlemen:-

We enclose herewith Contract for our
year's requirements in Ball Bearings duly signed.

We wish to take this opportunity to in-
form you of the excellent results we have had
with R.I.V. Ball Bearings during the past few
years we have used them, also wish to compliment
you on the prompt and efficient service and at-
tention you have always given to our orders. We
feel sure that so long as you maintain your pre-
sent policy you certainly must succeed, and wish-
ing you all prosperity and good luck for the fu-
ture, beg to remain

Yours very truly,

SIMPLEX AUTOMOBILE COMPANY INC.

Carroll

A Sense Of Gratification

is surely warranted when a continuance
of business is provided for under such
pleasing conditions as expressed in the
above letter.

The R. I. V. Co. has been more than
fortunate. It has been progressive in the
marketing of an Imported Ball Bearing
which year after year continues to main-
tain its prestige for efficiency and superi-
ority, thereby retaining for itself the con-
fidence and business of the manufacturers
of high grade motor cars and machinery—

"Here, There and Everywhere"

R. I. V. COMPANY

S. W. Corner 57th Street & Broadway
New York

Imported Since 1904

Jiffy Curtains Cost More

But You Can Have Them on Any of These Cars

Abbott-Detroit
Chandler Six
Franklin
Haynes
Hupmobile
Howard-Six
Hudson

Keeton
Knox
Krit
Lewis
Lexington
Locomobile

Lozier
Luverne
Maxwell
Mitchell
Monarch
Oakland

Oldsmobile
Palmer-Singer
Packard
Paige
Pierce-Arrow
Pilot

Regal
Studebaker
Speedwell
Stevens-Duryea
White
Winton
Willys-Knight

This large majority of manufacturers, all of whom equip their cars with Jiffy curtains, pay more for them than they would have to pay for the awkward, old fashioned carriage curtains. They pay more for them than they would have to pay for any makeshift.

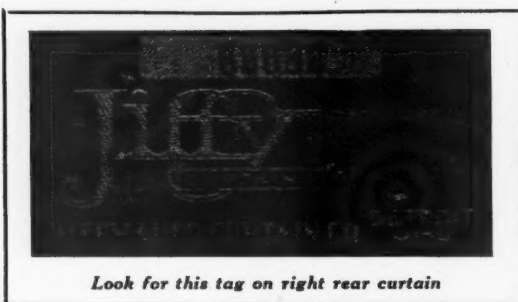
But they are worth more, and most of these automobile builders have adopted Jiffys as standard equipment because they are superior in every way to any other style curtain—because Jiffy curtains are today recognized as the standard automobile curtain of the world, and—because these manufacturers desire to give their users the very best in every detail. Their use of Jiffy curtains is an example of their manufacturing policy to use only the highest grade equipment, even though the initial cost is a trifle higher. You are pretty sure to find that any car using Jiffy curtains is using the same high-grade character of all other articles of equipment.

Jiffy curtains were the first successful automobile curtains ever designed. Up to that time motor cars were equipped with the old style carriage side curtains. Since their advent there have been many attempts to imitate but none has equalled the Jiffy.

Write us for full information

Jiffy Auto Curtain Co.
Detroit, Michigan

Note how conveniently Jiffys are thrust back out of the way for entrance or egress



Look for this tag on right rear curtain

Jiffy curtains are constructed on the sensible, scientific principle that an automobile curtain should be. Their accordion pleated panels slide back and forth on a flexible black japanned cable concealed in the top and held taut by a spring. A simple movement of the hand, without leaving the seat, and they are closed or opened. When closed and fastened on the inside they afford absolute protection from wind or rain alike and when not in use are folded up in the top, out of sight. Each panel has a separate light—there is much more light than with ordinary curtains.

They last the life of the car, because when folded the panels are flat—never rolled or bent and there is no chance for the celluloid to crack or break.

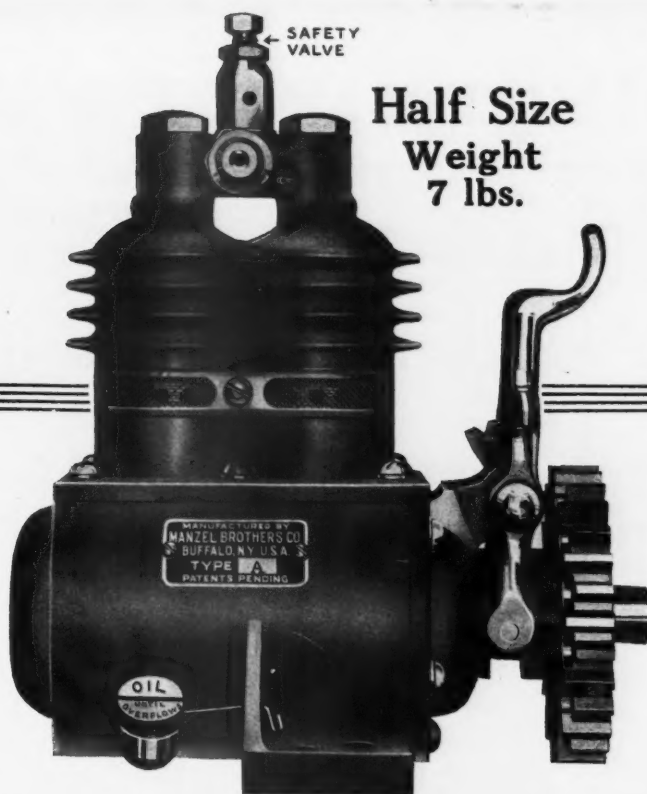
Top makers all over the country are replacing old style curtains with Jiffy curtains. The work is simple and inexpensive.



**Especially
Adapted
to your
car**

**Half Size
Weight
7 lbs.**

**Simplicity
Durability
Speed**



MANZEL

ENGINE DRIVEN TIRE PUMP

MANZEL

Absolutely Ready for Immediate Attachment to Abbott-Detroit, Buick, Cadillac, Cole, Cartecar, Chalmers, Hudson, Howard, KisselKar, Maxwell, Mitchell, Oakland, Overland, Packard, Paige-Detroit, Reo, Speedwell, Studebaker, Stutz and Other Cars.

Everything is furnished complete and any one can do it. The services of a mechanic are not required, no special tools are needed, no machine work of any kind need be done. Complete installation can be made in less than an hour.

The old fashioned method of pumping a tire by hand is now obsolete. Practically every up-to-date car is equipped with a power pump and every up-to-date motorist is putting one on his car.

THE MANZEL for simplicity and efficiency is the greatest of them all. It inflates the largest tire in two or three minutes. It saves 20 to 25 per cent in tires by keeping them properly inflated. It weighs less and lives longer than the complicated four cylinder type, and it gives the most complete satisfaction on the thousands of cars on which it is now equipped.

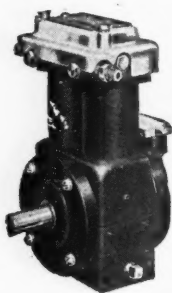
Our literature on the subject of pumps is extremely interesting and will show you why **THE MANZEL** is the one best pump for your car.

MANZEL BROTHERS COMPANY
306 Babcock Street, BUFFALO, N. Y.



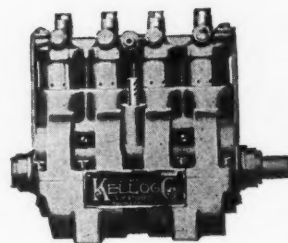
THE ridiculous effort to keep your tires up to manufacturer's requirements by inferior tire pumps is little more absurdly futile than to try to get a power tire pump to do good work on your car without scientifically designed attachments.

You can make no mistake if you use



Engine Driven **KELLOGG** Air Pump

One, Two, Four, Six Cylinder Models



After five years' experience in the manufacture and sale of engine-driven air pumps, we have given up the idea that any one pump will satisfy all requirements. Therefore, we have used the Kellogg principle and make a one, two, four and six cylinder pump to meet different requirements and for these different pumps make special attachments to meet further individual requirements. The result is the Kellogg pump that will do more work in a shorter time than any pump made.

The very best material and workmanship is employed. Bronze connecting

rods, drop forge shafts, genuine Babbitt bearings. D. W. F. ball bearings on larger pumps. Attachments carefully fitted so that work and installation is easy and positive.

Standard or special equipment on cars like the

Packard
Peerless
Lozier
Stevens-Duryea
Lexington
Hudson
Pierce

Chalmers
Franklin
Winton
Havers
Stearns
Buick
Imperial
Jackson
Chandler
Willys-Knight
Howard
Mitchell

About 20 others

Owners

Send in the name and model of your car.

Dealers

Attachments are made for the car you handle.

Manufacturers

We can furnish special pumps in quantities to meet your special requirements.

Every old car and every new car ought to have a Kellogg pump to save tire expense

Kellogg Manufacturing Company

Main Office and Factory: Rochester, N. Y.

NEW YORK

SAN FRANCISCO

CHICAGO

DETROIT

Distributing and Service Stations in all localities

CATALOG ON REQUEST

We also make an air-starter unit for the Ford; also larger air-starting units for practically all cars made. Write for Catalog.

397! 398!
399!! --w-d-!!

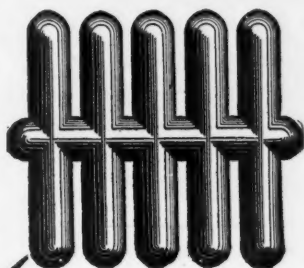
And I could do it for him easily in about one-tenth the time!



SAFETY FIRST

It's the Tough Goodrich Safety Tread
that Prevents Tough Luck

The Goodrich Safety Tread



Five Bars and a Crosstie
the "Safety First" Symbol

Just the unit-group of bars and crosstie to grip the road and distribute jolts and strains evenly, so that the Safety Tread runs like a smooth tread and gives longer wear and service.



This picture from a photograph shows how the Goodrich Safety Tread Tires on the rear wheels overcame the skid of the smooth tires on the front wheels.

Goodrich Safety Tread Tires

Best in the Long Run

The thick, tough Goodrich rubber fingers of the Safety Tread dig down and grip the road. They stop the skid. They make the brake effective and steering sure.

Goodrich *quality* in the tire backs up the Goodrich Safety Tread.

The extra thickness of tough Goodrich rubber in the treads at the point of contact with the road gives you longer wear and lower-cost mileage.

Here are the prices to pay for the best tires ever produced in the Goodrich factory:

Size	Smooth Tread Prices	Safety Tread Prices	Grey Inner Tube Prices	Size	Smooth Tread Prices	Safety Tread Prices	Grey Inner Tube Prices
30 x 3	\$11.70	\$12.65	\$2.80	34 x 4 1/2	\$33.00	\$35.00	\$6.15
30 x 3 1/2	15.75	17.00	3.50	35 x 4 1/2	34.00	36.05	6.30
32 x 3 1/2	16.75	18.10	3.70	36 x 4 1/2	35.00	37.10	6.45
33 x 4	23.55	25.25	4.75	37 x 5	41.95	44.45	7.70
34 x 4	24.35	26.05	4.90	38 x 5 1/2	54.00	57.30	8.35

Dealers almost everywhere have Goodrich tires in stock or can get them for you from one of our branches or depots.



Factories:
Akron, Ohio

The B. F. Goodrich Company

Branches in All
Principal Cities



There is nothing in Goodrich Advertising that isn't in Goodrich Goods

When Writing to Advertisers, Please Mention Motor Age.

Never Before Such Springs as These

Cleveland-Canton Automobile Springs

Springs that outlast ordinary springs three to one—springs that never seam, crack or split—springs that mean long life, reduced upkeep, retarded depreciation of your cars.

Steel experts tell us they have reached the limit in this new "cross-rolled" process.

Instead of rolling the steel longitudinally only, the steel used in Cleveland-Canton Chrome-Vanadium Springs is worked *both longitudinally and transversely*.

It is knit closer together, homogeneously, more uniformly. It is free from blow-holes, flaws, and hidden defects.

Only such steel is fit for Cleveland-Canton Chrome-Vanadium Automobile Springs. We use it exclusively.

Cross-Rolled Chrome-Vanadium

**"Not a
Bump in
One of
Them"**

**"Built for
Life-Long
Endurance"**

Poor springs ruin cars. For an engine cannot long stand the severe jolting and racking such springs permit.

But Cleveland-Canton Chrome-Vanadium Springs stand terrific strains, absorb the shocks, and are amazingly enduring.

If you want to

- Prolong the life of your engine,
- Reduce up-keep expense,
- Retard depreciation,
- Add to comfort and safety,
- Prevent delays and repairs,

See that your cars are equipped with Cleveland-Canton Chrome-Vanadium Springs. They

shield the whole delicate mechanism of the car and carry it gently over rough roads. You should be vitally interested in this. Let us tell you the whole story. Write today.

"Far the Cheapest to Use"

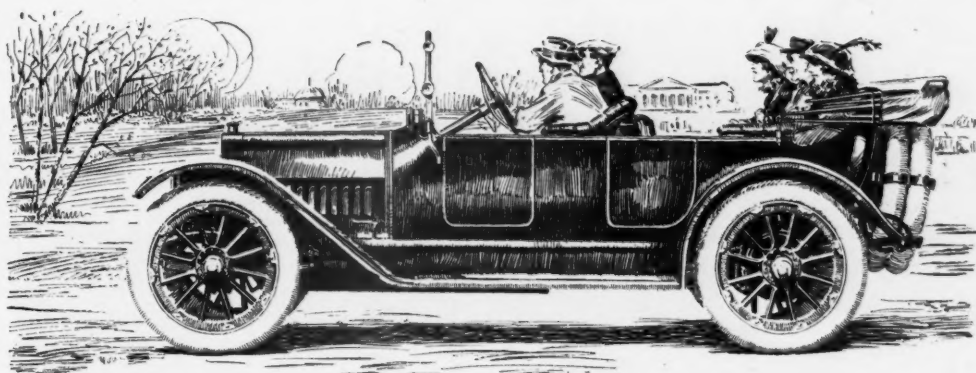
"In operating 2 ton trucks on a fast mail and passenger route between Columbia and Campbellsville, Ky., we had great trouble with continual breakage of springs. Last year we equipped our cars with Cleveland-Canton Chrome-Vanadium Springs and have had no further difficulty with broken springs. We consider Cleveland-Canton Springs by far the cheapest and most satisfactory to use.

"W. R. MYERS & SON,
"Columbia, Ky."

Best Grade—Chrome-Vanadium
Next Best — Special Analysis

The Cleveland-Canton Spring Co.
Canton, Ohio, U. S. A.





When You Buy That New Car—

If it's a Kissel Kar you're sure of the following facts—

That you have bought a very handsome car, a car you will always be proud of, a car of graceful lines and "personality."

That you have bought an unusually comfortable car, a car whose easy riding features were worked out by specialists.

That you have bought an unusually convenient car, a car of roomy dimensions and all the niceties and refinements that contribute to the joy of motoring.

That you have bought an unusually simple car, a car easily handled in traffic or in the open road and with the fewest number of parts consistent with long life.

That you have bought an unusually able car, a car that will take you where you want to go, whether it be the summit

of the Rockies or across the Mojave Desert.

That you have bought an unusually dependable car, a car so strongly and sturdily built that you constantly wonder at its combined endurance and flexibility.

That you have bought an economical car, a car of low fuel, tire and general maintenance expense.

That you have back of you a company that means something when it offers service and is willing to put in writing just how much it will do and how far it will go to insure the continuous and satisfactory operation of your car.

What more could you expect in the purchase of a car?

Three Models—40 "Four," \$1850; 48 "Six," \$2350; 60 "Six," \$3150.

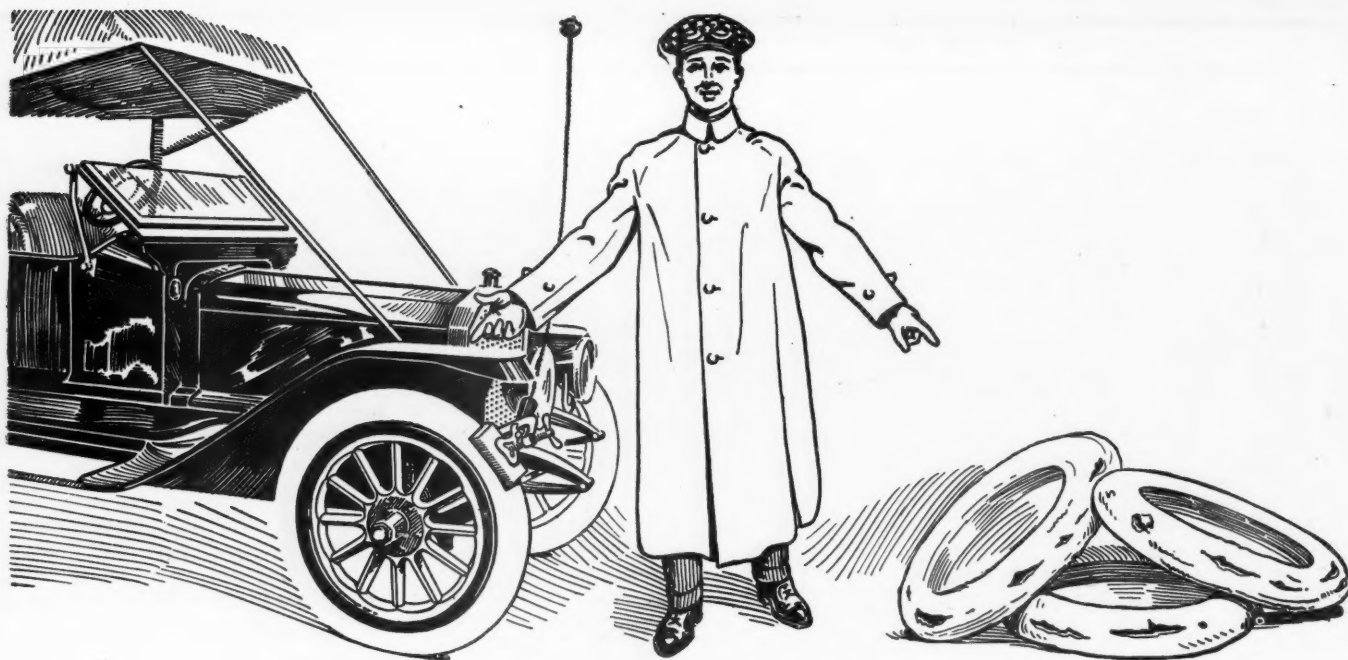
An early decision will mean early delivery—settle the question now.

Kissel Kar Trucks—six sizes, 1,500 lbs. to 6 tons. Ask for truck portfolio.

Kissel Motor Car Co., 121 Kissel Ave., Hartford, Wis.

BOSTON, NEW YORK, CHICAGO, MILWAUKEE, KANSAS CITY, MINNEAPOLIS, ST. PAUL, DALLAS, SAN FRANCISCO, LOS ANGELES, OAKLAND, Philadelphia, Detroit, Houston, El Paso, Washington, Baltimore, Nashville, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Rochester, Providence, Cincinnati, Newark, Montreal, Quebec, Toronto, Winnipeg, Calgary and 300 other principal points throughout America.

KISSELKAR



SHALER Vulcanizers

Make One Tire Outwear Three

The Shaler is the Standard Vulcanizer used by the best garages and repair shops everywhere. We make the only complete line of vulcanizers, from the small vulcanizer for motorists' use at home, to complete Garage Equipment. We are the largest manufacturers of vulcanizers in the world and our complete line includes vulcanizers of every type—Electric—Gasoline—Alcohol and Steam for every requirement.

Save Your Tires You can repair any puncture, blow-out, tear or hole in any casing or inner tube—anywhere—in a few moments with a Shaler Vulcanizer. Vulcanizes thoroughly and makes the repair the strongest part of the tire. Every Shaler has automatic heat control which makes it impossible to overcure or undercure the tire. The Shaler does not need to be watched. It works automatically. Simply clamp the Shaler Vulcanizer to your tire and it does the rest. A boy can operate it.

Treble Your Mileage Keep your tires in good condition with a Shaler Vulcanizer and you will get extra long mileage. Seal up the little holes, stone cuts, etc., (that expose the fabric to dirt and water) increase your mileage and stop your tire trouble. A Shaler Vulcanizer pays for itself many times over in increased mileage.

Save Repair Bills A SHALER VULCANIZER SOON PAYS FOR ITSELF BY SAVING REPAIR BILLS—but you do more than save repair bills—you save time and trouble and at the same time save two-thirds your tire cost by trebling the mileage you get from your tires. Buy the best tires and keep them in good condition and watch the saving in trouble and expense. Mend the little holes and little cuts and prevent blow-outs, and punctures. Carry a Shaler Vulcanizer as part of your regular equipment, then you can quickly "Seal the Cuts and Save the Tires."

Prevent Blow-Outs Every time you seal a cut or tear in a casing you prevent a blow-out that is bound to occur if the cut is left open and the fabric exposed to dirt and water. If you stop the little hole or stone cut you prevent the big blow-out and possibly a serious accident.

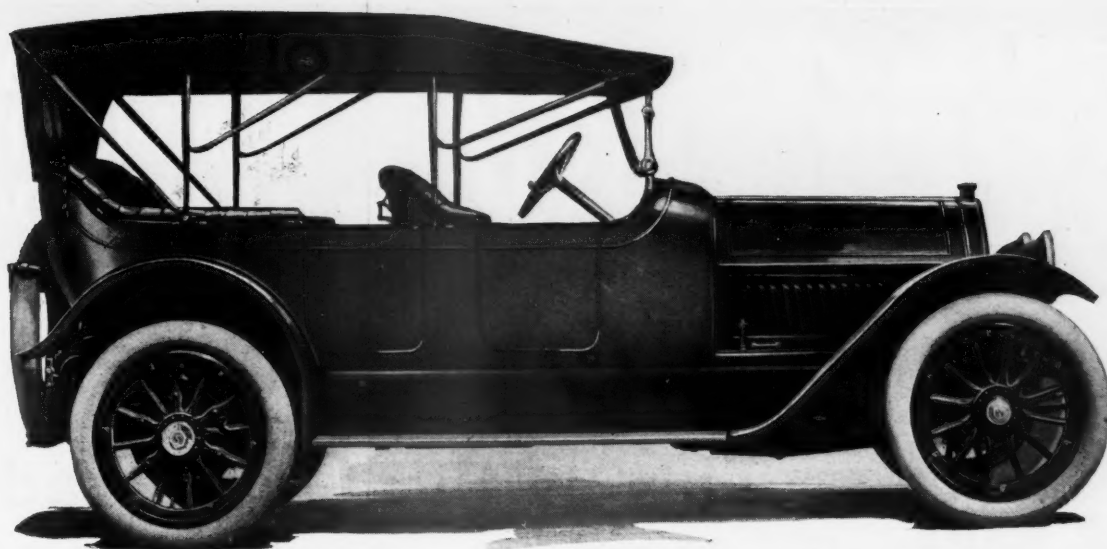
Free Book "Care and Repair of Tires"

will be sent postpaid on request. Every motorist needs it because it's full of valuable information and hints about the care of tires.

To Dealers—Garages and Repair Shops The Shaler is the only complete line of Vulcanizers made—recognized as "Standard" everywhere. It is the only Vulcanizer with Automatic Heat Control. More Shaler Vulcanizers are sold than of all other makes combined—and every Shaler is Guaranteed. Many dealers make \$15 to \$20 a day extra profit vulcanizing tires with Shaler Vulcanizers. Accessory Dealers find them quick sellers that give perfect satisfaction. Every Garage and Repair Shop needs a Shaler Vulcanizer for its own use, and can increase its profits by selling them to motorists to use at home. The Vulcanizer is the only accessory never furnished with any car's equipment, and every motorist needs one. Get full information—with Special Dealer's Book—"Common Sense About Tire Repairs."

C. A. SHALER COMPANY, 215 Fourth Street, Waupun, Wisconsin

Canadian Distributors, John Millen & Son, Limited, Toronto, Winnipeg, Montreal, Vancouver, Victoria



Here in the SPEEDWELL ROTARY SIX is the greatest advancement in motor design

Speedwell Rotary Sixes are now in service and are delivering a brand of motor car satisfaction heretofore unknown. Any owner of the new Speedwell with Rotary Valve Motor will tell you that the performance of the motor is little short of marvelous.

There is smoothness and flexibility in power application and freedom from vibration that delights the experienced and discriminating. When it comes to silence the lack of any perceptible motor noise is almost uncanny—the whir of the speedometer gearing, the click of the magneto spark breaker, the suction of air through the carburetor, that have formerly passed unnoticed—are the only sounds audible.



But these things are not the only benefits. Here in the Speedwell Rotary Motor is permanency—long life. The valves will not wear out, are most unlikely to ever even require adjustment.

On tests extending beyond the one hundred thousand mile mark no valve wear has been manifested to the slightest degree.

Upon request, we will send you the whole story of the Speedwell Six Cylinder Rotary Valve Motor and of the superb new car which employs this motor. The car has a wheel base of 135 inches, electric lighting and starting and every desirable modern accessory.

The five passenger is \$2850—the seven passenger \$2950.

The Speedwell Motor Car Co.

Address Department M

Dayton, Ohio

When Writing to Advertisers, Please Mention Motor Age.

HIGH *and* LOW TENSION MAGNETOS

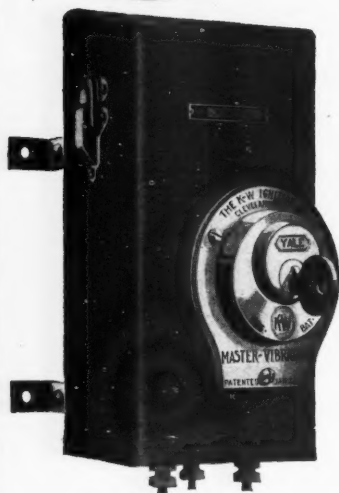


MASTER VIBRATORS ROAD SMOOTHERS AUTO LOCKS

Attention Ford Owners!



← This is the Only Trade Mark Under Which K-W Master Vibrators are Sold



\$16 with K-W
Autolock Switch

You are particularly cautioned against imitations apparently resembling the K-W Master Vibrator in many details and being offered by some dealers under private trade names. Look for the K-W Trade Mark and serial guarantee number.

A handsomely finished box means nothing. It's the electrical detail that makes a Master Vibrator reliable and efficient, and years of service alone will prove this. Over 90,000 K-W Master Vibrators giving efficient service is proof that the K-W is electrically right. That is why every K-W Master Vibrator is "Guaranteed for Life."

The K-W Master Vibrator is the Standard of Excellence all over the world. It's a tried and proven accessory for a Ford car, with 100% efficiency.

ITS USE MEANS

Perfect Ignition—More Power
One Adjustment Instead of Four
A Hotter Spark—Easier Starting
A Smoother Running Engine
Less Carbon Deposits—Less Gasoline Used
Cleaner Spark Plugs—No Worry

Only one adjustment. It takes the place of four separate vibrators in your coil, giving you one fast vibrator and a powerful condenser, which insures absolute synchronism.

The K-W Master Vibrator, while resembling an ordinary vibrator, is really a scientifically constructed magnetic circuit breaker which times the spark more accurately and gives better and surer ignition than a high tension magneto. It can be put on in half an hour, no change in the car being necessary.

The K-W Autolock Switch can be installed on your Ford car in five minutes—absolutely prevents theft—and costs but \$3.50.

Write for folder.

Your nearest dealer will gladly show you the merits of the K-W Master Vibrator. Literature on request.



\$15 with Regular
Kick Switch

HEADLIGHTING OUTFITS

THE **K-W** IGNITION CO.
2835 CHESTER AVE. CLEVELAND, OHIO, U.S.A.

SPARK COILS SPARK PLUGS

If your lights
fail suddenly—

What?
Then •



Test it out at home before you try it on the road.

Go into a dark room with a lighted match. Then blow out the match and see how long it takes you to see where you're walking. For several moments you are practically blind.

Suppose you were on a high banked road, or a slippery road, or a dangerous curve, and the same thing occurred.

What might happen before you could see where you were steering?

Electric light depends upon the perfect working of delicate, complicated apparatus. It may snap out at any instant without a second's warning.

You can rely on—

Prest-O-Lite

You *know* it is dependable. You *know* that it safe-guards the safety of your passengers. You *know* that, should you carelessly allow the gas supply to run low, your lights will die down gradually, giving you ample warning.

In addition Prest-O-Lite gives the best driving light. It lights a broad path ahead of the car and at each side—not a spot half a mile away.

Get complete information

By using the coupon, you can get complete information on ALL Lighting systems—reports of actual tests—road experiences—a world of information on the vital question of lighting. Use the coupon—today.

The Prest-O-Lite Co., Inc.

233 Speedway, Indianapolis, Ind.

(Contributor to Lincoln Highway)

Exchange Agencies Everywhere

And you can easily light and extinguish Prest-O-Lite from the dash, giving you every convenience. The Prest-O-Lite, or any other *really good* automatic lighter, does this.

Prest-O-Lite consumes no engine power, needs no expert repairs, and doesn't keep your car tied up in the repair shop.

No matter what self-starter is on your car, your headlights should be gas lights. Reliable light is just as essential as fuel.

THE PREST-O-LITE CO., Inc.

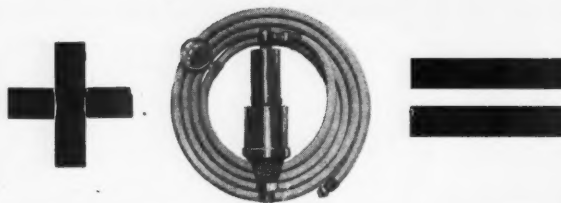
233 Speedway, Indianapolis, Ind.

Please send information on ALL Lighting Systems to—

.....

.....

.....



A MAYO Pump stands between hard, back-breaking **work** and perfect pumping **comfort**. You have to work **with** a hand pump—a MAYO harnessed to your motor works **for** you.

MAYO *SPARK* PUMP

* You use your muscles with a hand pump—a MAYO Pump uses the motor's muscles. You simply **watch** a MAYO inflate your tire.

Sun, perspiration, blisters, backache—you can laugh at them! The beauty of it is that your motor and your MAYO will inflate a tire five times faster than **you** can with a hand pump. **You** can't compete with **machinery**.



It costs just exactly \$10.00 to free yourself for life from hand pumping. \$10.00 is all the MAYO Pump costs.

This is the lowest-priced complete pump outfit obtainable. You can pay as high as \$30.00 for a pump outfit if

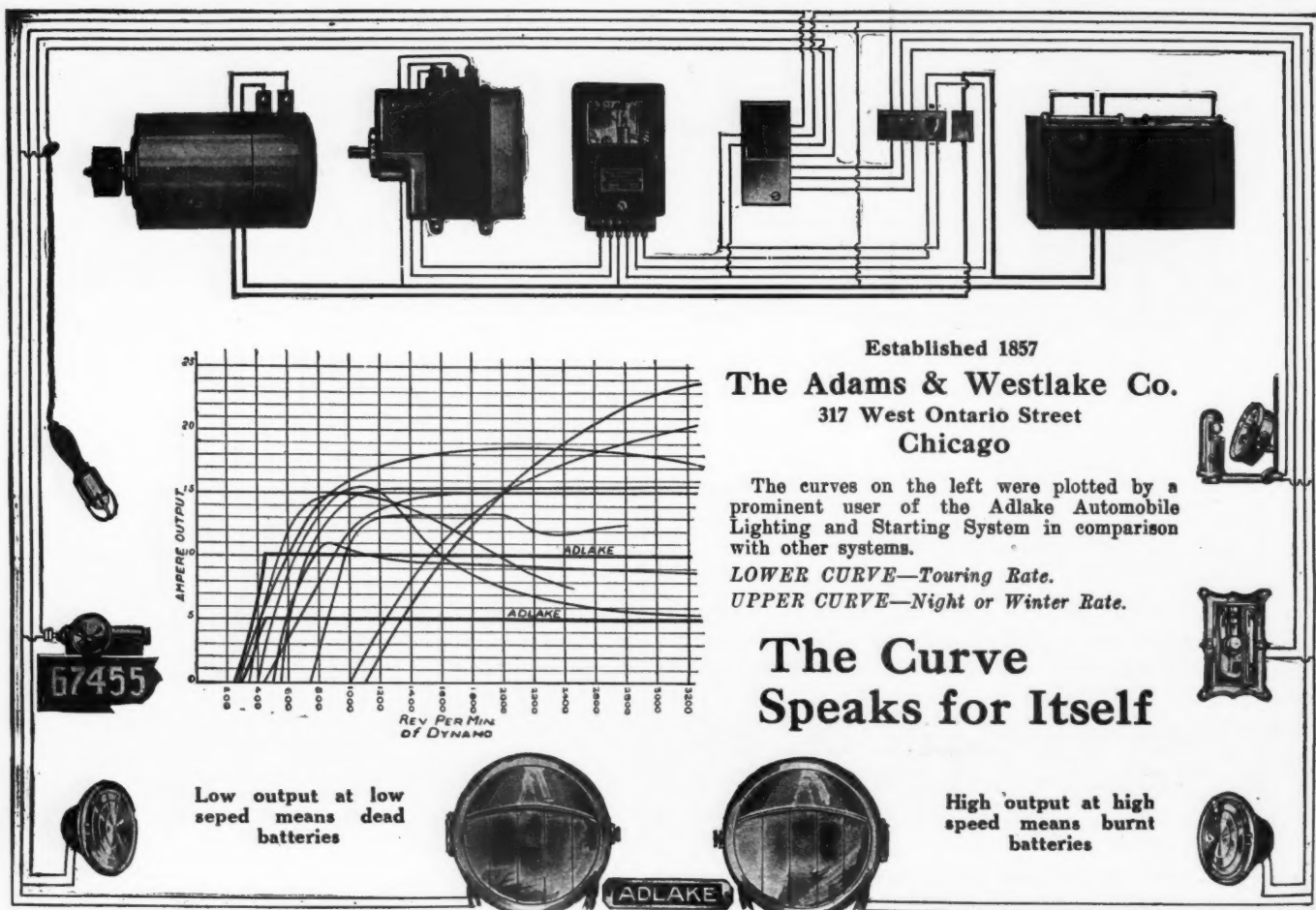
you care to, but why **pay more** for a pump that won't do **more** than a MAYO?

The MAYO is the oldest pump of its kind on the market. You take no chances when you purchase it.

Price, Complete with Gauge, \$10.00. Quick Detachable Spark Plug, \$1.50 extra

You can try a Mayo free on your car for 30 days. Write us

MAYO MANUFACTURING CO., 55 E. 18th St., CHICAGO, ILL.



When Writing to Advertisers, Please Mention Motor Age.

The Smaller the Car the More It Needs

GABRIEL SNUBBERS

\$15, \$20, \$25 per set of Four, Two Front and Two Rear. Half These Prices per Pair

Although Gabriel Snubbers are standard factory equipment on such cars as White, Stearns, Peerless, Oldsmobile, and Lozier, they are even more necessary on lighter cars.

That's because the shorter the wheelbase, the more abrupt and severe will be the jolts. The shorter and stiffer the springs, the more snappy will be their rebound.

To add Gabriel Snubbers is like lengthening the wheelbase and increasing the flexibility of the springs.

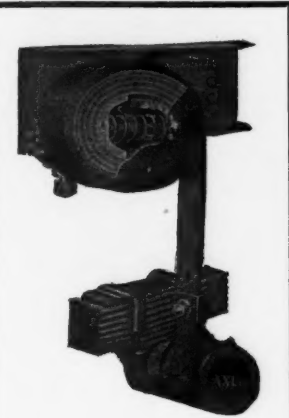
Think of the Riding Comfort, the Lessened Repair Expense and the Year or Two Extra Service

Booklet sent on request

Gabriel Horn Mfg. Company

1415 E. 40th Street

Cleveland, Ohio



When the car springs compress, the belting is quickly drawn into the coil. On the instant the springs start to expand, friction within the coil retards paying out the belting. That prevents snappy rebound or excessive action of the springs—the two causes of jolts and jars.

When springs are at rest there is practically no "pull" on the belting. The rebound is checked solely by friction of the coils of belting upon a metal band between them.

Snubbers are as easy to attach as a pair of lamps. Nothing to work loose, rattle, wear out or require re-adjustment. Snubbers will outlast the car.

Every Feature You Need —All Standard—and the Price Only \$1195

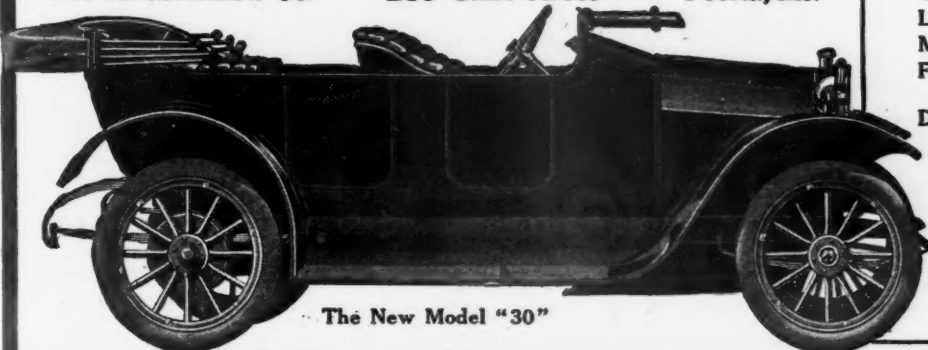
Study the Glide "30" as you would a piece of merchandise. Consider the market value of every feature in its make-up—compare it to the finest detail with the cars selling at double its price. Furthermore, the Glide "30" is backed by a strong guarantee for one full year. And this guarantee is further backed by a strong, conservatively managed concern whose sales have increased every year since it was organized in 1882.

Here's the car that's really every man's car. You could not ask for better in **power, endurance, comfort and appearance**. Write us for catalogs.

Dealers: Write us for our agency proposition. It's a profit maker.

The Glide "36," \$1840 The "Thoroughbred." More of them are being sold every day to shrewd buyers who know automobile value when they see it

The Bartholomew Co. 215 Glide Street. Peoria, Ills.



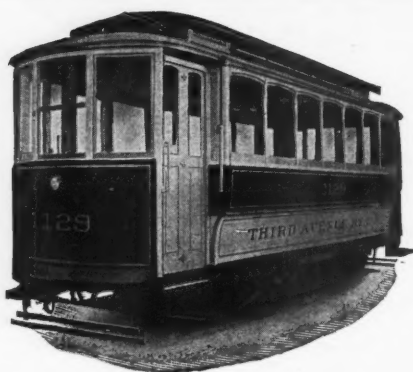
The New Model "30"

Glide

Model "30"

**Double the Price Could
Not Beat This
Equipment**

- Electric Starter
- Electric Lights Throughout
- Unit Power Plant
- Long Stroke Motor, with four cylinders en bloc
- Center Control
- Left Side Drive
- Motor Driven Tire Pump
- Floating Rear Axle, with pressed steel housing
- Demountable Rims, with one spare rim
- Windshield
- Speedometer
- Tire Irons on rear for extra tire
- Jack, Tool Kit, Tire Repair and Flash Lamp



THE first successful storage-battery-driven street cars went into steady service in New York, over three years ago. Each is still profitably driven over 120 miles per charge by its

Gould Storage Battery Gould

THIS same battery, driving electric pleasure or commercial vehicles, gives the same wealth of power good mileage per charge, long life, economy and reliability.

Suppose there were no Gould Storage Battery!

Suppose its beneficial competition did not exist and users of batteries were left to the mercies of take-it-or-leave-it monopoly!

Suppose none of the Gould inventions and improvements had been given to the industries!

Electric vehicle operation, railroad train-lighting, submarine boat propulsion and power plant economy might have remained in the primitive stages of fifteen years ago!

Don't invest a single dollar in storage batteries without obtaining the benefit of this powerful competition.

Gould battery renewals fit jars of any make.

Gould Storage Battery Co.

General Offices: 30 E. 42d St., New York City Works: Depew, New York

Boston—14-16 Cambria St. Detroit—88 E. Congress St.
Philadelphia—613 Betz Bldg. Chicago—The Rookery.
Cleveland—Am. Trust Bldg. San Francisco—904 Rialto Bldg.
Los Angeles—110 E. Pico St.

Agents in Washington, Kansas City, Denver, Topeka, Seattle
CANADIAN REPRESENTATIVE:

R. E. T. Pringle, Toronto, Montreal, Winnipeg, Vancouver
Full stock of parts, plates and repairs carried by all offices and agents.

(90)



IF

Your Automobile is equipped with the

Pyrene

FIRE EXTINGUISHER

You Can Secure
15% Reduction

In Your Fire Insurance Premiums

Pyrene is the only effective extinguisher on highly inflammable fires, such as oil, gasoline, calcium carbide.

Pyrene will not freeze at fifty degrees F. below zero and is good until used, for it does not deteriorate, neither can it evaporate from the container.

Pyrene is non-damaging and non-corrosive. Pyrene Extinguisher is easily operated by man or woman and can be refilled as readily as a kerosene lamp.

NOTE—Pyrene brass and nickel-plated are the only type of fire extinguishers that qualify to obtain the 15% insurance reduction.

The Aetna Accident and Liability Co. and The Automobile Insurance Co. of Hartford, Conn., allow this reduction—See their agents or consult your own broker.

At all first-class auto supply dealers. Send postal to nearest branch for booklet—proving the service and true economy this scientific fire fighter brings to you.

Brass and Nickel-Plated Fire Extinguishers are the only one-quart Fire extinguishers included in the lists of approved Fire appliances issued by the National Board of Fire Underwriters.

Pyrene Manufacturing Co., 1358 Broadway, New York

Alton	Chicago	Louisville	Philadelphia
Anderson, S. C.	Cincinnati	Memphis	Pittsburgh
Atlanta	Cleveland	Milwaukee	Richmond
Baltimore	Dayton	New Orleans	St. Louis
Birmingham	Denver	Norfolk	St. Paul
Bridgeport	Detroit	Oklahoma	Salt Lake City
Boston	Duluth	City	San Antonio
Buffalo	Jacksonville	Phoenix	York, Neb.

Pacific Coast Distributors: Gorham Fire Apparatus Co. Seattle
San Francisco Los Angeles

Distributors for Great Britain and the Continent:
The Pyrene Co., Ltd., 29A Charing Cross Road, London, W. C.



DON'T DO THIS

If you are using an inferior cylinder oil, you are probably spending a good part of the touring season, and many hard earned dollars, pulling down your motor to remove the carbon deposits.

Use EAGLEINE NO-KARBON OIL and learn what it means to have your motor maintain its maximum horse power throughout the season, without the necessity of cleaning.



EAGLE OIL & SUPPLY COMPANY

Chicago Branch
1114 W. 37th Street
Chicago, Illinois

104 Broad Street
BOSTON, MASS.

Roger W. Stadlman
21 Hoover Street
Los Angeles, Cal.

Thus easily
you can climb
hills with a

BUDA

MOTOR

"The Part That Sells the Car"

The car is a **SPAULDING**, made by the Spaulding Mfg. Co. of Grinnell, Ia., and propelled by a Buda Motor, 4 cyl., 4x5½. The grade of the hill is 45%. (The grade of the motor is "A1" like every other BUDA.) What? 45%? Yes 45%. There was no road of any sort. The climb was made on the turf. ("You don't mean to say on the raw soft turf!") "Yes, on the raw soft turf. There was no road." The hill is at Belmont, Ia., and is called Potato Knoll. Many cars had tried it. All had

failed. The Spaulding (with BUDA MOTOR) took up a full load on low gear and went up *easily on high* with driver alone.

Manufacturers who use Buda Motors do not talk nonsense about cars "all built in our own shops." They aim to deliver performance rather than piffle, and know that the way to build a good car is to build it around a motor built by a motor **SPECIALIST** — the best motor that money can buy — the BUDA Motor.

THE BUDA COMPANY

FACTORY, HARVEY, ILL., (Chicago Suburb)

Address all correspondence to our **FACTORY REPRESENTATIVES**

BRANDENBURG & COMPANY

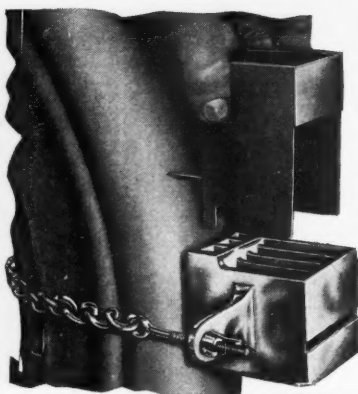
1108 S. MICHIGAN AVE., CHICAGO

57TH & BROADWAY, NEW YORK CITY

FORD BUILDING, DETROIT

When Writing to Advertisers, Please Mention Motor Age.

\$3⁵⁰ Now Buys the World's Greatest Steam Tire Vulcanizer



Patent Pending

Jobbers and Dealers! Here's your chance to tie to a big, quick seller

We've cut the price of Positive Portable Steam Tire Vulcanizers from \$5.00 to \$3.50—and build a better vulcanizer! To sweep unworthy competition from the field — competition that was hurting the entire industry — we have cut the price \$1.50. They can build a *poor* vulcanizer to sell at a cheap price, but they can't build a *good* vulcanizer to sell at a low price. You are the gainer

from our action, Mr. Motorist. At \$3.50 this wonderful steam vulcanizer is the biggest value offered in the automobile field today. Pays for itself over and over again in one season. A complete outfit, including scissors, measure, repair gum and tube stock, comes with every

POSITIVE PORTABLE STEAM TIRE VULCANIZER

Mends any ragged or clean-cut hole in tube or casing, up to 2½ inches, in one 20-minute setting. Larger holes require another setting. It's portable and automatic and simple in operation. Absolutely guaranteed *not* to burn the tire. Vulcanizes by steam—the only scientific vulcanizing agent. Uses either gasoline, kerosene or alcohol for fuel.

Sold Under a Money-Back Guarantee

Every vulcanizer we sell carries a broad money-back guarantee of satisfaction. Thousands in successful use. At \$3.50 you cannot afford to be without one. Ask your jobber or dealer or fill out the coupon and we'll send full particulars direct.

POSITIVE SUPPLY COMPANY

442 Rock Island St. Davenport, Iowa

Mail This Money-Saving Coupon

POSITIVE SUPPLY CO., [22]
442 Rock Island St., Davenport, Iowa

Please send me full particulars regarding your Positive Portable Steam Tire Vulcanizer.

Name

Address

My Dealer's Name is.....

When Writing to Advertisers, Please Mention Motor Age.



YOU FEEL AT HOME AT THE McALPIN

YOU will be pleased with this hotel from the first moment you enter it. Because the atmosphere surrounding the McAlpin's unusual comforts is one of marked refinement and cordiality.

Largest and safest of the great hotels of the world—with cuisine of rare flavor—appointments of distinctive beauty and prompt, INTELLIGENT service, the tariffs of the Hotel McAlpin are nevertheless notable in their moderation.

Location and surroundings are ideal. At Broadway and 34th Street—with the Pennsylvania Terminal only a block removed and the Grand Central Station a short distance away—you have only to step from the McAlpin doors to be among the city's greatest shops, theatres and office buildings.

If you appreciate the myriad conveniences of a perfectly appointed hotel your happiest days will be spent at the McAlpin.

Management of MERRY & BOOMER

HOTEL McALPIN

Herald Square

NEW YORK

Nearer than Anything to Everything





To Specify the Tuthill Titanic is to End Spring Breakage

To make an unbreakable spring we had to first eliminate the center bolt, as this made the point where the greatest strain came the weakest. Then we tested different formulae and compounds before we found the best steel. Two analyses of every shipment of this steel are made to catch any slump in quality. Then the completed spring undergoes a series of Rigid Tests—thus giving the spring harder conditions than it will ever meet with in actual use.

These are just a few of the many reasons why a Tuthill Titanic Spring never breaks. Let your next spring be a



Guaranteed Absolutely Against Center Breakage

Every Tuthill Spring is guaranteed unreservedly against breakage at the center—the very spot where 75% of all springs snap. This is in addition to our regular guarantee which goes with every Tuthill Spring.

Tuthill Special Repair Service

Motorists who have Tuthill Titanics under their car do not have broken springs, but those whose springs do break need no longer lay up their car because of a broken spring. Our Service Department is prepared to express, on a moment's notice, a spring for practically any model of any car. Wire or write—prompt service.

Thus dealers can give their customers the prompt service they demand. And giving them a far better spring than the one that broke—The Tuthill Titanic—they build up a big replacement business. The price for a Tuthill Spring is lower than other springs of the same high quality—the repair man makes a larger profit—and the car owner gets a better spring.

The automobile spring that can be depended to give motorists every possible comfort, not only in ordinary service, but under the most severe and trying conditions, is the Tuthill Titanic. No dread of spring breakage with a Tuthill Spring under your car. Write for price-list.

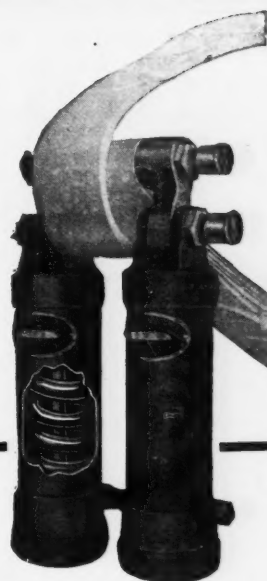
TUTHILL SPRING CO.

762 Polk Street

Chicago

1723

Tuthill Titanics are guaranteed not to break at center



Coxajusto
ADJUSTABLE TO ANY LOAD

A Real Shock Absorber

A twist of the wrist at the base of the absorber adjusts it to the load. Can't slip; locks with a dog. Comfort and saving in repair bills assured. Will pay for themselves many times over. Strong and durable.

Price, \$25.00 to \$35.00

"Best Made Because Made Best"

SPECIAL FORD MODEL

\$10.00 a Pair

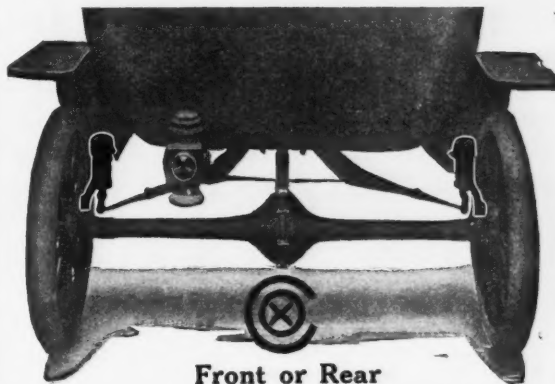
Send for Catalog. Address Dept. A.

Cox Brass Mfg. Co.

Established 1872

ALBANY, N. Y.

1777 Broadway,	- - -	NEW YORK CITY
870 Woodward Ave.,	- - -	DETROIT, MICH.
899 Boylston St.,	- - -	BOSTON, MASS.
2637 Michigan Ave.,	- - -	CHICAGO, ILL.
1216 Van Ness Ave.,	- - -	SAN FRANCISCO, CAL.

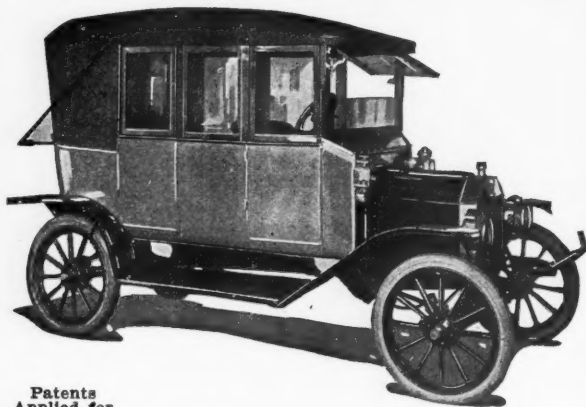


Front or Rear

When Writing to Advertisers, Please Mention Motor Age.

LEWKOWICZ

Give Pleasure Comfort Protection
CONVERTIBLE BODIES



Patents
Applied for

Converted
IN LESS THAN

ONE MINUTE'S TIME

FROM A

Touring Car to a Closed Car

WITHOUT THE USE OF

Any Tools! Screws! Bolts! Pins!



Patents
Applied for

Manufactured for EVERY MAKE of CAR
FROM A

Ford to a Pierce Arrow

PRIVATE OWNERS---Write for particulars on your cars!

AGENTS---Write for our agency proposition!

MANUFACTURERS---Write for license rights for this wonderful invention which is a necessity today!

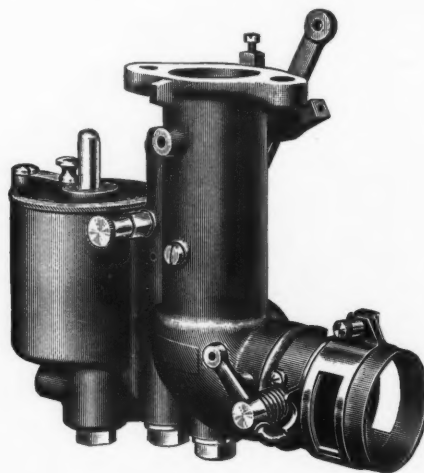
**Convertible Automobile
Body Corporation**

OFFICE AND FACTORY:

1885 Park Ave., cor. 128th St., New York City
Phone 3478 Harlem



In foreign fields American cars are handicapped. Send his product where he will, the American manufacturer finds the car of Europe has preceded him and established the standard of its various parts. And of these standard parts the Zenith carries prestige.



**The Value of
Prestige**

The Zenith is endorsed by more than 150 of the best known makes abroad. In every nook and corner of the far-off places some of these cars are always found. The Zenith, in the minds of these buyers, is universal and a guarantee of motor worth. Extensive Zenith advertising in many languages drives home this fact.

**American Cars
Zenith Equipped**

Why not cash in on this prestige? Why not give an impetus to sales in export fields. Give the familiar Zenith to the buyers who know its reputation and performance. It will raise the value of your product and smooth the road toward popularity. Try it. Others are doing it with marked success. Send for the Zenith story—it's free.



MAKE \$250⁰⁰ A MONTH Repairing AUTO MOBILE Tires

Sounds
like a lot of money
—IT IS—A WHOLE
LOT of MONEY to be earning
CLEAR every month—yet it's
what hundreds of men we have estab-
lished in the Automobile Tire Repair
Business are making. You let down the
DRAW BRIDGE for SUCCESS to enter into
your career by getting into business for your-
self. The business for you is the one where in-
vestment is small—the returns quick and for
cash—where the margin of profit is large—the de-
mand for your PRODUCT or SERVICE constant
and ever on the increase.

A HAYWOOD TIRE REPAIR EQUIPMENT

answers to all of these requirements of Old Dame Fortune—The certainty of success in this business is as sure as anything in this world can be—Each year adds thousands of new Automobile Owners—they need YOU to keep their tires in service.

Here Is Your Opportunity!

Be first to enter this new big paying business in your town. Open your pockets. Let the dollars pour in. Act quick. Every auto sold means more tires to mend. Automobile business is growing fast—enormous field for tire repairing. Punctures and blowouts are common. Tires need retreading and vulcanizing. Something going wrong all the time. Thousands forced to buy new tires because they can't get old ones fixed. Think of the old bicycle days—repair shops on every corner—all making money—busy day and night. Autos make same proposition over again—only ten times bigger and better. Users of Haywood Tire Repair Plants are making big money. Johnson, Tex., writes: "I have made as high as \$18 in a day." Another man who bought a plant September, 1911, writes he has cleared over \$3000.00. That's going some! Operate a plant as side line in connection with auto business—garage or as an independent business. Find neighborhood where there's a bunch of autos—get all the steady business besides transient work. Experience unnecessary. You learn quick. Simply follow directions—practice a few days on a couple of old tires and you'll be ready to coin money. Business comes fast and easy.

Repair Tires At Home

Young men! and boys repair father's tires—get money he pays garage man. Get the neighbor's work. Make money to attend college or to start a garage and repair business.

Auto Owners—Repair your own tires—save money—pay for your outfit in short time. We have outfits for home use. Anyhow, investigate. Send today for catalogue. See the wonderful possibilities in this marvelous field. Learn of the enormous money-making opportunities in this fascinating new business.

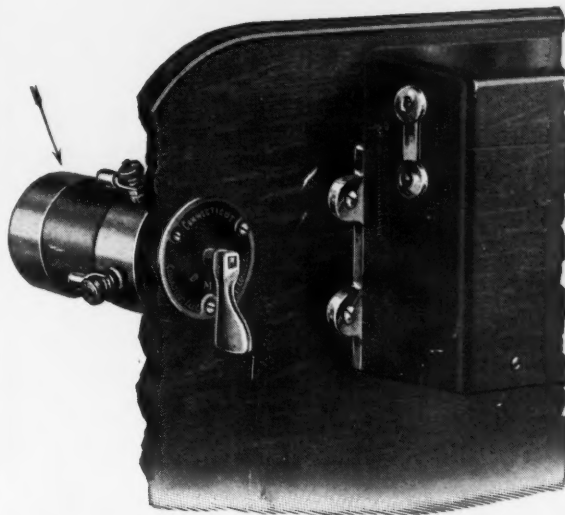
Haywood Tire & Equipment Co.
720 N. Capital Ave., Indianapolis, Ind.

The New Money-Making Business
—Start Now—This Man is Making Money

Business Keeps Coming



CONNECTICUT



Master Vibrator For Ford Cars

Fits flush with the dash and does not detract from its trim appearance.

Small, neat, compact—this efficient, alternating current master vibrator draws minimum current from the magneto.

This special vibrator insures easy starting—increased power, a smooth running engine—freedom from frequent adjustment of coils.

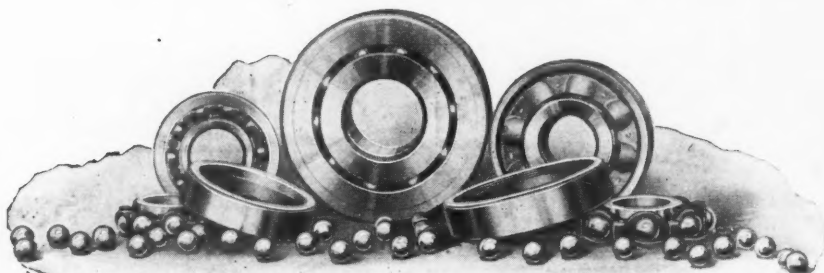
Install one of these special vibrators on your Ford car and obtain real magneto service at lowest cost.

PRICE \$9.00

From your dealer or delivered on receipt of price

Write for Bulletin No. 36.

Connecticut Tel. & Electric Co., Inc.
Meriden, Conn.



HAVE YOU EVER INVESTIGATED THE MERIT OF NEW DEPARTURE BALL BEARINGS?

SPEAKING as one American manufacturer to another, are we not entitled to an opportunity of demonstrating to you the quality and several reasons why so many American car makers are using New Departure guaranteed ball bearings in preference to the foreign made? It will pay you to let us go into this matter thoroughly with you.

If you will send us your blueprints, together with data regarding maximum and minimum speeds and loads, our Engineering Department, which is expert and highly specialized, will prepare interesting information regarding the adaptability of New Departure ball bearings to the various points of your car.

This information will not be based upon theory, but upon a careful and constant study of bearing mounting practice of engineers and manufacturers in America and abroad. This co-operative service is freely at your disposal.

THE NEW DEPARTURE MANUFACTURING COMPANY, Bristol, Conn.

Western Branch, 1016-17 Ford Bldg., Detroit, Michigan

They Pay for Themselves in the Fuel they Save



STA-TITE
Perfect Compression
Piston Rings

PATENTED

Old style leaky piston rings can waste as much fuel as a leaky gas tank. Leaky piston rings cause a motor to lose compression—that means short mileage, short power, and big gas bills.

STA-TITE Piston Rings *can't* leak. They won't sap the strength of your motor or "kite" your fuel bills. STA-TITE Rings make every drop of gasoline you pour into your fuel tank register "horsepower" at the drive-shaft, and "big mileage" on the speedometer. Have a set installed this spring when you overhaul.

STA-TITE Rings are made in three pieces. All joints automatically seal when the ring is placed on the piston. Adapted to autos, motor boats, etc. Made of special processed gray iron. Can be attached to any piston. Money refunded if not satisfied.

LIBERAL TERMS TO SUPPLY HOUSES AND REPAIR SHOPS
WRITE FOR LITERATURE.

STA-TITE PACKING RING COMPANY
3043 Olive Street, St. Louis, Mo.

Here's a Pump for Your Small Car



"The Brown, Jr." It inflates your tires with pure cool air. Works by motor not muscle.

Just unscrew your spark plug, screw in the Brown, Jr., and start your motor on low speed.

Save that temper, trying back breaking work.

The Brown, Jr., with 10 feet of woven air hose tested to 500 pounds pressure sells for \$7.00. \$8.50 if you want a Brown Q. D. Spark Plug and connections.

Simple, durable, efficient, practical.

The lowest priced power pump ever offered and positively guaranteed to give service and satisfaction.

The accessory sensation of the Season.

Ask your dealer or write us for full information today.

THE BROWN COMPANY
120 Bellevue Syracuse, New York

PATENTED

NO
MAN
IS
RICH
ENOUGH

to afford
a cheap
Plug in
his motor.
A poor
spark
requires
a richer
mixture
and more
gasoline.
Cheap
Plugs,
with their
cracking
Porcelains
or oil-
soaked
mica, lose
half the
current



MILLIONS
ARE
SPENT
TO
ADVERTISE
PLUGS

The
millions
of de-
lighted
users
of the
HERZ
PLUG
are our
adver-
tisement

Buy HERZ PLUGS

They will prove the best investment of your
life, one that will bear rich interest in
Smaller Gasoline Bills

ASK YOUR DEALER

HERZ & CO., 245 W. 55th Street (Just off Broadway.) New York



SOONER or later you're going to experience real
trouble if you drive without a Basline Autowline
along. Punctures, blowouts, engine troubles, holes and
ruts are incidents of the road, and when "something happens,"
you'll need a

Basline Autowline

"The Little Steel Rope With the Big Pull"

to get you home. Why not discount the inevitable? Get a Basline
Autowline at once and be ready to tow or be towed. Basline Autow-
line is about 25 feet long, one-fourth inch in diameter and has
hooks and slings for instant attaching. It is finest quality steel
wire rope, same as world-famous Yellow Strand, and, despite its
small size, has enormous pulling power. Price east of Rocky Mountains, is \$3.95. All
accessory dealers have it.



FREE A fine illustrated circular tell-
ing all about Basline Autowline

Broderick & Bascom Rope Co.
813 North Second Street, St. Louis, Mo.
New York Office, 76 E. Warren St.

Manufacturers of famous Yellow Strand Wire
Rope that helped to build the
Woolworth Building, New York.



GUARANTEED FOR 10,000 MILES

Puncture-proof—Blowout-proof—Skid-proof—Rut-
proof—Rim-cut-proof—Oil-proof and most resilient

This shows construction that makes guarantee possible.



A written 10,000 mile guarantee accompanies every tire.

10 Days' Free Trial

To remove any possible doubt concerning the merit of
Bricton Tires and to back up our statement to you we
will allow you ten days' trial on these tires at our risk.
If Bricton Pneumatic Tires are not perfectly satisfactory
in every way, you can return them to us any time within
10 days and we will cheerfully refund the entire purchase
price.

We can rebuild your tires like this

If you are not in need of new tires and the fabric
in your present tires is still good, we can rebuild
them the Bricton way, making them puncture-
proof—non-skidding—blowout-proof—and oil-proof
and rim-cut-proof.

All the weak points in previous tire construction
have been eliminated in the building of the
Bricton Pneumatic Tires. No motorist can afford
to pass by the opportunity to be relieved of all
future tire troubles.



For particulars write

THE BRICTON MANUFACTURING CO.

Main office and factory, 1244 Bricton Bldg., Brookings, S. Dak., U.S.A.

BRANCHES

BOSTON182 Friend St., Dept. 1244
NEW YORK250 West 54th St., Dept. 1244
PHILADELPHIA611 Bulletin Bldg., Dept. 1244
DETROITMajestic Bldg., Dept. 1244
PITTSBURG1201 Hartje Bldg., Dept. 1244
CHICAGO2009 S. Michigan Ave., Dept. 1244
ST. LOUIS3150 Locust St., Dept. 1244
SAN FRANCISCO909 Monadnock Bldg., Dept. 1244



SHIFT
THIS LEVER
FORGET THE
WEATHER

Many a dollar, and many a horsepower, has been lost between the fuel-tank and the drive-shaft simply because the Carburetor wasn't a—

Motsinger
Carburetor increased mileage guaranteed

The MOTSINGER is what engineers call an "all-weather" carburetor. You can instantly adjust it so that every change in temperature, altitude or humidity may be taken advantage of.

You control your engines power and economy the year through.

Try a Motsinger on Your Car or Truck.

Motsinger Device Mfg. Co.

881 Putnam Street LAFAYETTE, INDIANA

Write for interesting literature describing how and why we can guarantee the MOTSINGER to pay for itself.

THE LEVER WEIGHS
OUT A JUST RIGHT
MIXTURE HERE



On long hauls or short hauls you need Troy Trailers. On short haul work Troy Trailers will eliminate the time lost in loading and unloading your truck.

On long haul work you can deliver at least twice as much per trip as with the truck alone.

Isn't it worth investigating? Bulletin R will give you all the details. Write for it.

The Troy Wagon Works Co.

Clay Street, Troy, Miami Co., Ohio

The V-Ray Spark Plug

The Spark Plug with a Reputation

pre-eminent in the choice of Motorists who know Spark Plug efficiency.

Sold with a Positive Guarantee

that heat or oil cannot injure them. V-Rays will outlast your car. They're best because they give

More Power on Less Gas

Superior for Automobiles, Motorcycles and Motor Boats.

Insist on the Genuine V-Ray

Two Types
Porcelain "MIKA"
\$1.00 || \$1.25



At All Jobbers and Dealers

The V-Ray Co.

MARSHALLTOWN, IOWA



Starts — Lights — Ignites

REMY

Six Volt System—Does-It-All

Remy Apparatus

Has been adopted by these exacting manufacturers, whose cars are listed below—BECAUSE Remy products have proven themselves 100% efficient:

Stutz	Premier	National
Reo	Studebaker	Mitchell
Auburn	Marathon	Detroit
Empire	Zimmerman	

Remy country-wide system of service stations is a valuable sales asset to YOU.

Modernize Your Old Cars—
Investigate Our Exchange Proposition

REMY ELECTRIC COMPANY

Laboratories—Factories—General Offices
ANDERSON, INDIANA, U. S. A.

Apperson "45"—\$1785

**"OUR" CAR!**

Actually "ours." We build 95% of the parts of this efficient, economical, aristocratic motor car in our own factories. Every essential, to the smallest detail, is designed and made by us to fulfill properly its function in a perfect "unit" automobile.

Contrast this with the assembled car—parts made in many factories and simply put together.

Because we build the Apperson, we eliminate the parts maker's profits and the heavy expense incurred in collecting parts prior to assembling. We put that money into the Apperson.

Into each part we have built the priceless years' experience of the Apperson Brothers. We have achieved—because it is our car—the greatest accessibility—every part can be reached without removing the body.

The fact that Apperson is not an assembled car is a strong selling argument.

Address Dept. B for quick action.

Apperson Bros. Automobile Company

KOKOMO, INDIANA
CHICAGO 3300 Indiana Ave. PORTLAND, ORE. 58 N. 23rd St. SEATTLE, WASH. 907 E. Pike St.

Acme Torsion Springs

**GUARANTEED TO MAKE FORD YOUR****The Easiest Riding Car in the World**

Could we make a stronger guarantee? And notice it is not a mere claim—it is a positive guarantee.

WHY? Because ACME TORSION SPRINGS are based on SCIENTIFIC PRINCIPLES, properly applied. ACME TORSION SPRINGS, the only practical device on the market that can act FREE with, and CONTINUOUSLY IN CONJUNCTION with the LEAF SPRINGS, any way they are called upon to work, and adjust themselves MECHANICALLY to all conditions.

We Challenge Contradiction of Our Claims

Get an Expert's Opinion

Equip your car with ACME TORSION SPRINGS

Insurance for life of occupants, car and easy riding. Don't be fooled by "shock absorbers." What you want is more spring capacity under proper Automatic Control. Acme Torsion Springs add at least 18 feet to the total leaf spring area, every inch adding greater resiliency automatically controlled.

Acme Torsion Springs stop vibration, prevent spring crystallization and breakage, minimize tire and engine trouble, and improve the riding qualities of any car at least 100%. They cost less than half the price of shock absorbers, and are worth several times as much. Eliminate Vibration and you eliminate trouble. We have convinced thousands, let us convince you.

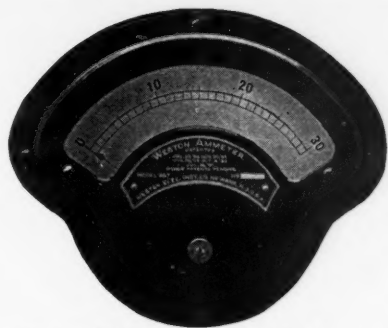
N. B.—Acme Torsion Spring Equipment is fully Guaranteed against Defects and Breakage for the life of the car.

Write today for information.

Acme Torsion Spring Co.
994 Boylston St., Boston, Mass.

WARNING!

Acme Torsion Springs are covered by letters of patent, and we have the sole and exclusive right to manufacture, use and sell the same. Take warning that our interests will be protected.

A Reliable Electrical Measuring Instrument Indicates Quality

Weston Model 267 Dashboard Ammeter

WESTON AMMETERS

for control of **Electric Lighting and Self-Starting Systems** are the most reliable, durable and highest grade instruments made for this purpose

Please send for our 30-page bulletin No. 8 describing them

Weston Electrical Instrument Co.
NEWARK, N. J.

New York Boston Denver Birmingham Montreal
Philadelphia San Francisco Cleveland Toronto Paris
Chicago St. Louis Detroit London Berlin

**SPLITDORF PLUGS**

are the real standard of plugdom—soot-proof, gas-proof, & unbreakable. SPLITDORF PLUGS are ECONOMIC in that they "stand up" under the hardest usage better than any other plug on the market.

Insist upon SPLITDORF.

Write to nearest Branch House for Details

SPLITDORF ELECTRICAL CO.

Atlanta—10-12 E. Harris St. Newark—290 Halsey St.
Boston—180-182 Mass. Ave. New York—18-20 W. 63d St.
Chicago—64-72 E. 14th St. Philadelphia—210-12 N. 13th
Cincinnati—811 Race St. San Francisco—1028 Geary St.
Dallas—402 S. Ervay St. Seattle—1828 Broadway
Detroit—972 Woodward Ave. Toronto—469 Yonge St.
Kansas City—1823 Grand Ave. Dayton, Minneapolis
Los Angeles—1226 S. Olive St. London, Buenos Aires

Free for 30 days

FREE to start on a rich mixture—
 FREE to reduce to a lean mixture after starting—
 FREE to brake by motor, reducing brake-lining friction—
 FREE to get prompt action from your self-starter—
 FREE to blow out cylinders, eliminating carbon—
 FREE to develop all power of which your motor is capable—

Don't continue to waste a third of your gasoline when you can prove the

M & M CONTROLLER AND ECONOMIZER

on a Fair, Square, Money-Back Basis

Here is our offer—we will let you prove our claims on your own car at our risk. Tear out this advertisement—pin it to a \$5 bill or check together with your name and address—and we will send an M & M CONTROLLER & ECONOMIZER prepaid. Try it out on your own car for a whole month, and if it does not fulfill every claim made above, send it back to us and your money will be returned without question. Any dealer is authorized to duplicate this free trial offer.

Use gasoline only when you need power and save a third. Thousands sold at \$10 each—increased output enables cut in price to half. Act quickly—get a full season's use.

THE M. & M. SALES CO., Inc., Lewistown, Pa.

Send for FREE descriptive folder "T" that tells how you can get MORE power from LESS gasoline!

Reference: Citizen's Nat. Bk., or Lewistown Trust Co., Lewistown, Pa.



CROWN PRINCE

PRESSED STEEL

DEMOUNTABLE WHEEL

If you value safety, comfort, durability, more speed and less tire wear, insist upon Crown Prince Wheels.

The leading cars of Europe have adopted them in preference to both wooden and wire wheels.

They will not break or buckle, are over 200 per cent stronger than the strongest wooden wheels, and fifty per cent easier on tires.

You wouldn't trust yourself in a car with a wooden axle—why take a chance on wooden wheels?

MAX BACHEM, Sole Representative for U. S. A.
 845 Jefferson Avenue, East Detroit, Mich.

Space contributed by MOTOR AGE.

\$5

Sent to
Emory W.
Clark up in
Detroit
makes you a
Life Mem-
ber of



The Anti-Pikers Association of America

One of these days you are going to get up, look the old boat over, and say: "Well, wife, let's start for Market Street" or "Let's drive to Broadway."

Not a bit ridiculous!

When they get that LINCOLN HIGHWAY finished you can do that very thing. It will be a joy to ride over it.

It's no pipe dream! It's a positive plan. It will be done!

Builders of motor cars and tire and other manufacturers have contributed millions. Cement makers have followed suit. Now we fellows with the cars should come across with our five spots or MORE.

We get in on the ground floor but we get in EASIER. Europe can't touch a tour over this Highway from Broadway to Market Street when it comes to REAL NATURE THRILLS, smooth going, wonderful scenery and OZONE that will put leather lungs in everybody.

THERE'S YOUR CHECKBOOK. You've got the manhood, the pen and the ink. DO IT NOW! They're waiting for you to sign. Pin this coupon to your check.

I am a regular motorist.

My name is

My address is

Herewith I contribute \$.....

Send me a contributor's certificate, membership card and radiator emblem.

**The Lincoln
Highway
Association**

Detroit, Mich.

When Writing to Advertisers, Please Mention Motor Age.

NOTICE!

Pursuant to an order duly made by the Referee in Bankruptcy, in the case of Knox Automobile Company, bankrupt, the undersigned will sell at public auction on the steps of the Hampden County Court House in Springfield, Hampden County, Massachusetts, on Friday, the twenty-fourth day of April, 1914, at ten o'clock in the forenoon, the following property of said bankrupt:

1. The manufacturing plant of the company, being a parcel of land in Springfield about 120 feet by about 800 feet bounded on Wilbraham Road, Waltham Avenue and the Railroad owned or operated by the New York, New Haven and Hartford Railroad Company, having spur track facilities and being in a location easy of access to the centre of the City and also to a good residential district. The buildings of the plant are of regular mill construction.

2. Four other certain parcels of land located near the manufacturing plant and being residential property.

3. All the machinery, materials, raw, wrought and in process and all of the finished product belonging to the said bankrupt estate and all other property and the said estate of every kind and nature, including patents and copyrights, excepting, however, and excluding cash, bills and accounts receivable, and choses in action.

Detailed schedules of the above property may be seen at the office of the trustee at the plant.

At the time and place of said sale the trustee will offer said property in lots or parcels in any substantial amount thereof as any bidder may desire. But the trustee reserves the right after having received bids on any lot to again offer the same property as part of a larger lot or to offer the whole of the aforesaid property as one lot if in his judgment it is for the best interest of the bankrupt estate to do so.

The trustee reserves the right to withdraw the whole or any part of said property from sale at any time before the auctioneer announces its completion by the fall of the hammer or otherwise.

The directors of the Knox Automobile Company have passed a vote directing the Clerk thereof to deliver to Charles G. Gardner, trustee as aforesaid, a consent in writing that any person or corporation, now existing or yet to be organized, that may buy from him as trustee as aforesaid the manufacturing plant of the bankrupt company, or any person or corporation to whom or to which the purchaser thereof from him may convey such plant, may assume the name of the Knox Automobile Company or any other name similar thereto.

Terms of Payment

Ten per cent of any bid made shall be deposited with the trustee at the time the bid is made (which shall be forfeited if such bidder shall fail to take and pay for property struck down to him, but shall be returned to him if the property shall not be struck down to him); the payment of the balance of the purchase price may be deferred for such time as the trustee may agree or consent to, provided the settlement of the estate is not delayed thereby, and provided that all deferred payments are secured to the satisfaction of the trustee; purchasers shall be entitled to use, turn in and apply in making payment of the purchase money, except the ten per cent thereof which shall be paid in cash, any proved and allowed claims against this estate which may be owned by them, reckoning the same for such purpose at such sum as the trustee may determine to be the minimum amount to which said purchaser as the holder of such claims will be entitled to receive on the distribution of the assets of the estate.

CHARLES G. GARDNER,

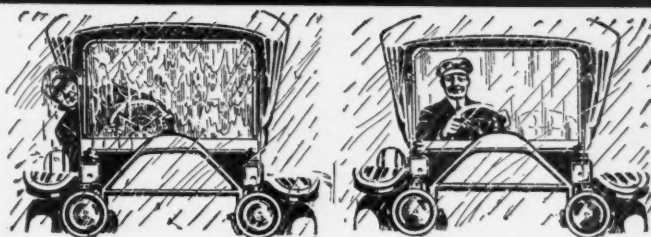
Trustee of the estate of Knox Automobile Company, Bankrupt.
 Springfield, Mass., April 1, 1914.

FORD Something **BETTER****USE PEDERSON "UNITED" TERMINALS**

on your Ford. The greatest improvement you can make. Only 50c by mail, postpaid. Oil your Ford from the seat. The Pederson Sight Feed Lubrication does it. We also manufacture for Ford cars the Handy Gasoline Turn-Off and the Stay-On Belt Holder.

Write today for our new Catalog just off the press

Pederson Lubricator Co., 638 First Ave., New York, N. Y.



Without Klear-Vieu

Using Klear-Vieu

Klear-Vieu

keeps the windshield
clear in the worst
rain or snow storm

25c A Can
from your dealer

or will be sent by mail on receipt of price

Klear-Vieu Company, 1789 Broadway, New York City

GEARLESS TRANSMISSION

Cartercar

SMOOTH—QUIET—POWERFUL

Model 7, \$1250

Other Models \$1600, \$1700, \$1900, \$2000

Write for full particulars and catalogue

Cartercar Company Pontiac Michigan

Practical Gas Engineer

By
E. W. LONGNECKER

Twelve years' constant experience with Hydro-Carbon Engines. How to start, how to operate, and how to care for all classes of explosive motors or engines using gas, gasoline or similar fuels. A full and exhaustive chapter on electric and other systems of igniting. Every line tells something. Every page full of interest. A book of 172 pages, neatly bound in cloth. Sent postpaid on receipt of price, \$1.00.

THE CLASS JOURNAL CO.
910 S. Michigan Ave., Chicago

"WARNER GEARS—STANDARD FOR YEARS"

"It's an absolute impossibility to 'open up' a plant and immediately deliver efficient gear assemblies.

"It takes time and experience—especially experience—to enable a concern to ship really dependable parts.

"This is an undisputable fact, no matter what the business happens to be.

"We are surely capable, in lieu of these facts, as for thirteen years we have been manufacturing automobile gear parts for the most successful and best known motor car manufacturers in the country.

"And listen, what is more, we've been pleasing them in every particular.

"Is there any better proof of a product's merit than one hundred per cent of satisfied customers?

"Looks as if we ought to be able to please you too."

**WARNER
GEAR
CO.
MUNCIE-IND.**

DETROIT OFFICE—628 FORD B'L'D'G.

Mr. Ford Owner!

Equip your own car with
"Chester" Demountable Rims—\$25

No alteration of wheels Simple Safe
DURABLE ECONOMICAL QUICK

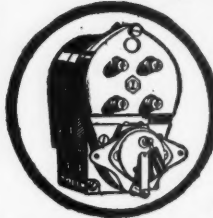
Easy for woman to operate

Send for book
 "FINAL WORD IN DEMOUNTABLES"

ASK YOUR DEALER

"Chester" Demountable Rim Company
 Fall River, Mass.

EISEMANN

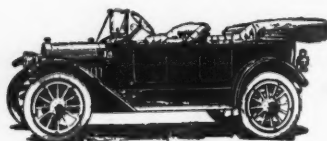


The performance of Eisemann Ignition Systems during the Indiana-Pacific Tour justifies every claim we have ever made for Eisemann efficiency and dependability.

The Eisemann Magneto Co.

Sales and General Offices
 32-33d St., Brooklyn, N. Y.

New York Indianapolis, Ind. Detroit, Mich.
 28 W. 52d St. 514 N. Capitol Ave. 802 Woodward Ave.



NOW
\$900

EMPIRE
 "The Little Aristocrat"

Completely Equipped

New Series Model 31, 110 Inch Wheel Base

A larger, more beautiful car, with every luxury and equipment.
 Increased production brings the price down to \$900.

With Remy Electric Starting and Lighting System \$1025

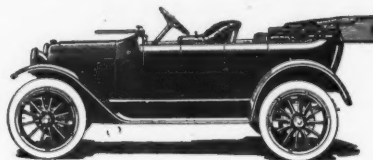
Advance catalogue with complete details is ready

Get a copy of the illustrated story of the Transcontinental Empire. Forty pictures.

EMPIRE AUTOMOBILE COMPANY, Indianapolis, U. S. A.

The Detroit — A Complete Line
\$850 to \$1050

Five
 Passenger
 Touring
 Car

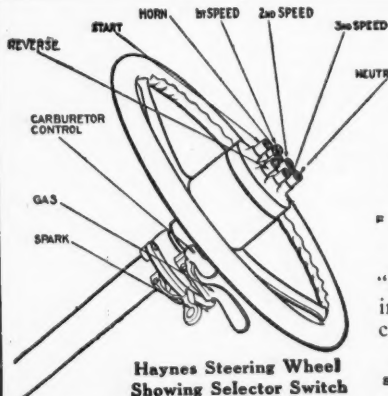


32 H. P.
 Long
 Stroke
 Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant,
 Platform Rear Springs, Full Floating Rear Axle, Left
 Hand Drive, Center Control, Drop Frame, Large
 Tires, Complete Ball Bearing Car.

BRIGGS-DETROITER COMPANY, 455 HOLBROOK AVE., DETROIT, MICH.

WRITE FOR SPECIFICATIONS



Electricity Shifts the Gears on the

HAYNES

"America's First Car"

Two "sixes" and a "four." Roadsters, touring and enclosed body cars.

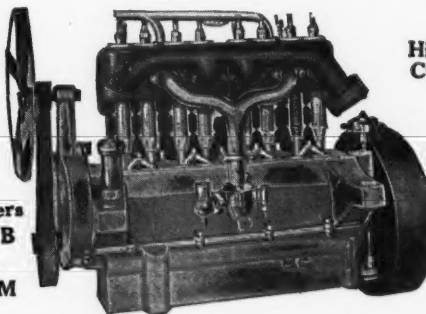
Haynes Steering Wheel
 Showing Selector Switch

Catalog covering this season's models upon request.

The Haynes Automobile Co. 2 Main St., Kokomo, Ind.

Brennan Standard High Grade Motors

Large
 Bearings
 Long
 Stroke
 4 and 6
 Cylinder



High Grade 4
 Cycle Motors

FOR

Elmore Cars,
 Warren, Cor-
 bin, White
 Steam Cars
 and standard
 makes of cars
 and trucks,
 also trans-
 mission gears.

4 Cyl., 5x5, 40 H. P., 4 Cyl., 4½x5, 35 H. P.

BRENNAN MOTOR MFG. CO., Syracuse, N. Y.



Model T. Runabout\$500
 Model T. Touring Car.... 550
 Model T. Town Car..... 750

With Full Equipment f. o. b. Detroit.

FORD MOTOR COMPANY
 Detroit, Michigan

Standardized

Transmissions



Covert Motor
 Vehicle Co.

Sales Office Detroit
 Factory Lockport N.Y.

KRUPP STEEL

IS NO EXPERIMENT. It is the best that brains and years of experience can produce. Manufactured in various grades for all motor car parts. Round forged bars of chrome nickel steel, grade E F 60.0, carried in stock in New York City.

THOMAS PROSSER & SON
28 Platt Street, New York City



WHITMORE'S AUTO GEAR PROTECTIVE COMPOSITION
For Transmission Cases
WHITMORE'S AUTO GEAR PROTECTIVE COMPOSITION
For Differential Cases
WHITMORE'S WORM GEAR PROTECTIVE COMPOSITION
WHITMORE'S ANTI-FRICTION COMPOSITION
For Gear Cops, Universal Joints, Etc.
WHITMORE'S CHAIN COMPOSITION
WHITMORE'S SILENT CHAIN COMPOSITION
WHITMORE'S SPRING COMPOSITION

Whitmore's Compositions

are used extensively in both high and low-priced cars. The makers of high-priced cars, with their every refinement of bearing parts, recognize

Whitmore Auto Gear Protective Compositions

as the best lubricants that can possibly be obtained and the manufacturer of low priced cars feels it is worth the additional cost to have his cars go out with this material installed.

In ordering Whitmore's Compositions, state definitely for what part of car lubricant is wanted.

THE WHITMORE MFG. CO.
Lubricating Engineers
33 Iron Court, Cleveland, Ohio, U.S.A.

Send for Interesting Booklet
"Stop Depreciation"



FEDDERS RADIATORS



Fedders Manufacturing Co., Inc.

Buffalo = = = N. Y.

Automobile Bodies

We design and build all types, ranging from a roadster body to the highest grade limousine, either in the white or upholstered and painted complete. Consult us before contracting for your season's requirements.

IRVIN ROBBINS & CO.,
Indianapolis, Indiana

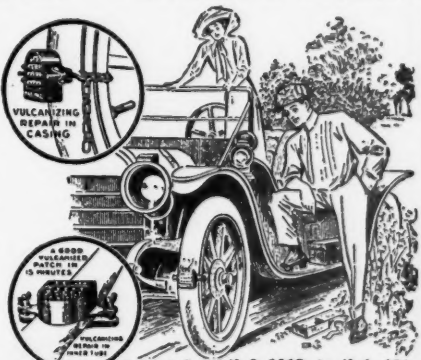
UNIVERSAL VULCANIZER

Tire Cuts Ruin Casings
They admit moisture to the carcass, cause the fabric to rot and weaken, grow larger—end in blowouts. You can repair casings and inner tubes anywhere in 15 minutes, good as a repair shop can do—and for one cent.

A Practical Vulcanizing Outfit Complete, with enough repair gum to make thirty patches. Weighs 3 pounds, can be carried in tool box.

Price complete, \$3.50
Ready for Instant Use.
At your dealers, or we will send it prepaid.
Guaranteed satisfactory or money refunded.

ADAMSON MFG. CO.,



Patented April 2, 1912, April 1, 1914
East Palestine, Ohio



THE WARNER MANUFACTURING CO.
TOLEDO, OHIO

Corcoran Lamps

GAS, OIL, AND ELECTRIC
CORCORAN LAMP CO.
CINCINNATI, O.



Skid Blowouts

Rimcuts
Punctures
Wearing Off
of Rubber
NIT

Each section 2 in. wide. They hook to rims. Try two or three sections over any old blowout.

Special Prices to the First in New Territory

KIMBALL TIRE CASE CO., 173 BOWY., COUNCIL BLUFFS, IA.

HAM'S

WRITE FOR

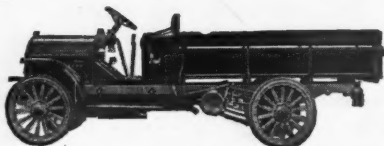
Steel MOTOR TRUCK LAMPS

C.T. Ham Mfg. Co., Rochester, N.Y.

CATALOGS
PRICES
DISCOUNTS

Republic Trucks

2000
Pounds
Capacity



\$1350
(Chassis
only)

2000 lb. REPUBLIC TRUCK WITH EXPRESS BODY

Alma Motor Truck Company

Sales Office: 890 Woodward Ave., Detroit, Mich.
Factories, ALMA, MICH. Service Stations, EVERYWHERE

SOONER OR LATER

you will ride on



WHY NOT NOW?

Dealers write for prices and discounts

The Essenkay Products Company
1127 W. 37th St., CHICAGO

This Economical Lubricant

has made ordinary oils and greases an extravagance at any price.

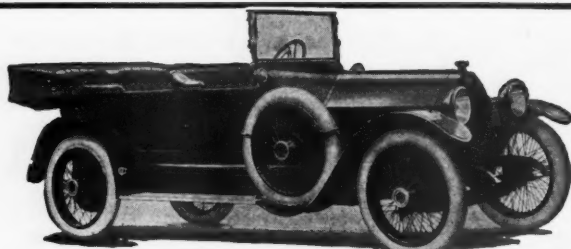


TRADE MARK REGISTERED IN
NON-FLOOD OIL
UNITED STATES PATENT OFFICE

is cheaper in the long run and the time to use it is NOW, and not after expensive repairs to bearings, differentials, etc., have disgusted you with motoring.

Packed only in orange colored cans bearing the above sprocket-wheel trade mark.

N. Y. & N. J. LUBRICANT COMPANY
165 Broadway, N. Y. City



BENHAM SIX

Continental 6 P motor, 48 H. P. Bosch Ignition. Brown-Lipe 4 speed forward transmission. Spicer Universal joints. Timken full floating rear axle. Timken front axle with Empico speedometer drive. Timken bearings throughout. Long radiator. One man top. Gemmer steering gear. Left drive, center control. Goodrich tires, 34 x 4 1/2. Electric starting, generating and lighting. 130-inch wheelbase. 3,600 lbs.

Two pass., \$2485; Five pass., \$2485; Seven pass., \$2535
BENHAM MFG. CO., Detroit, Mich.

KINGSTON CARBURETOR

Save Money by Economizing Gasoline

Four floating bronze ball valves opening automatically under different motor suction supply a uniform mixture at any speed, regardless of hot, cold, wet or dry weather.

Write for details and let us tell you why so many manufacturers are adopting this carburetor as standard equipment

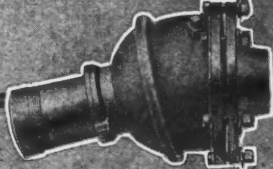
Made by the oldest manufacturers of carburetors in America

ESTABLISHED 1895

BYRNE, KINGSTON & COMPANY, Kokomo, Ind.

Spicer Universal Joints

DUST PROOF
OIL TIGHT



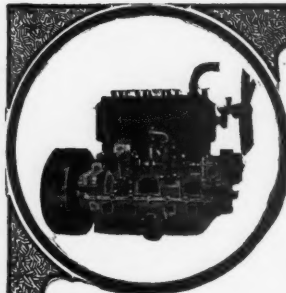
SPICER MANUFACTURING CO.
PLAINFIELD, N. J.

DOMESTIC REPRESENTATIVES

K. Franklin Peterson, 122 So. Michigan Blvd., Chicago
Thos. J. Wetzel, 17 West 12nd St., New York
L. D. Bolton, 1810 Ford Bldg., Detroit

FOREIGN REPRESENTATIVE

Benjamin Whitaker, 21 State St., New York



Continental Motors

4 and 6 Cylinder Types

Not made to meet a price, nor to shatter records of quantity, but to fulfill a service ideal—to be a true

foundation for a worthy motor vehicle.

Continental Motor Mfg. Co.
Detroit, Mich.

Factory Representative, K. F. Peterson, 122 S. Mich. Ave., Chicago



Does Your Motor Eat Up Money
for which you get no return in power? Cut out the gasoline waste. Make your motor develop every possible ounce of energy.



SU-DIG SPARK PLUGS

(Formerly Superior Double Ignition)

enable your motor to do more work with less gasoline by insuring perfect combustion of all gases in the cylinder. Double ignition (by two simultaneous, opposed sparks) does the trick! Write for folder giving information that will save you many dollars—your name and address on a postal brings it.

SUPERIOR MOTOR SPECIALTY CO.
46 N. Fourth St. Philadelphia, Pa.

Hupmobile

"32" Touring car, fully equipped.....	\$1050
"32" Roadster, fully equipped.....	1050
"32" Touring car or Roadster with Westinghouse two-unit electric generator and starter; electric lights; over-size tires, 38x4 inches; demountable rims, extra tire carrier at rear	1200
"32" 6 passenger touring car, fully equipped.....	1200
With the same options as above.....	1300
Coupe.....	\$1350
Delivery Wagon.....	\$1075

All prices F. O. B. Detroit

HUPP MOTOR CAR COMPANY
1228 Milwaukee Avenue Detroit, Mich.

"Bridgeport"

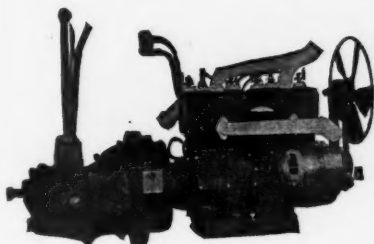
TRADE MARK

TIRE PUMPS

Are easy to use and easy to sell. They are durable and efficient—and are widely advertised. The cylinders are of seamless brass tubing which cannot rust. The "Stapley," the "Aeolus," "Windjammer," etc., give lasting satisfaction. Carry them in stock.

Bridgeport Brass Company
P. O. Box A Bridgeport, Conn.

Motors G-B&S Motors



We beg to announce our latest four cylinder Unit Power Plant.

This Motor includes the recognized engineering practice, here and abroad.

"Craftsmanship of long experience is the result of this distinctive Power Plant."

Detailed information on request, and we are in a position to make prompt deliveries according to contract.

GOLDEN, BELKNAP & SWARTZ CO.
DETROIT, MICH.



Electric Starting-Lighting Systems

EFFICIENT, SIMPLE, RELIABLE

Jones Electric Starter Company
Jackson Blvd. and Loomis St., Chicago, Ill.
DETROIT OFFICE: 1211 Woodward Ave.

Dayton Airless Tires

IMPORTANT NOTICE

When you order Dayton Airless Tires give the exact weight of car or the make and model.

Each size of these tires is made in several carrying capacities. This permits us to suit the riding quality to the weight of your car. This great advantage is found in no other tire. Attention to this detail will give you comfortable service and economy.

The Dayton Rubber Mfg. Co.
1005 Kiser St., Dayton, Ohio.

NEW YORK
Retail Branch
1851 Broadway

CINCINNATI
Retail Branch
1932 W. 8th St.

CHICAGO
Retail Branch
2123 Michigan Ave.



Established Agents
Solicited

Braender Tires & Tubes

SERVICE and SATISFACTION

The Only set of Tires to complete the entire 500-mile race at Indianapolis, May 30, 1913. Consider that 88 Tires of other makes were changed in this Race.

Our "Victory Folder" explains other races.

Braender Rubber & Tire Co.

Main Office & Factory Rutherford, N.J.
New York, 1987 B'way. Chicago, The Alfred Co. Boston, Dayton Tire Co. Pittsburg, Keystone Motor Supply Co. Indianapolis, Brant Bros. Columbus, O., Franklin Rubber Co. Troy, N. Y., G. H. Snyder. Newark, N. J., Ketcham & Lawrie.



The Atwater Kent Ignition System

For every kind and make of motor. A system ideal in efficiency, simplicity, and reliability.

Write today for booklet A.

ATWATER KENT MFG. WORKS
4934 Stenton Ave., Philadelphia.

Wizard Motors

**Maximum Power and Speed
Minimum Weight**

Wizard Twin Motors develop ten actual horsepower, with an actual weight, fully equipped, of only 85 pounds. This combination of great power with light weight is secured by the exclusive **Wizard** design and construction. Among the features that make **Wizard Motors** unequaled for efficiency are: overhead valve construction, long stroke, force feed mechanical oiling system, conspicuous simplicity.

*Have you received your copy of the Wizard catalog?
If not, you should write for it at once*

The Wizard Motor Co. Indianapolis, Indiana



You can have Detroit Springs on your car if you insist—and they're well worth insisting on. Write for booklet that explains the Self-Lubricating Device (patents pending), the forty-eight processes, the three decisive tests, the two-year guarantee.

Detroit Steel Products Co., 2260 E. Grand Blvd., Detroit, Mich.

THE RUTENBER MOTOR

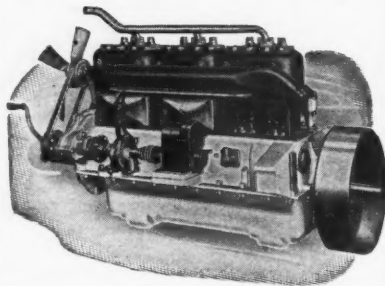
MANUFACTURED SINCE 1901 FOR HIGH GRADE
AUTOMOBILES AND TRUCKS

8 $\frac{1}{2}$ x 5 $\frac{1}{2}$ four and six cyl.
4 $\frac{1}{2}$ x 5 $\frac{1}{2}$ four cylinder
Standard or Unit
and

4 x 4 and 4 $\frac{1}{2}$ x 5 $\frac{1}{2}$ standard
types, all L head, 4 cycle
Manufacturers are in-
vited to investigate our
service and our facilities.
Literature on request.

**The Rutenber
Motor Company**

Marion, Indiana



The Searchlight Gas Co.

1016 Karpen Building

CHICAGO, ILLINOIS

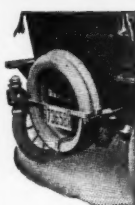
Stronger than ever, legally, financially and in the
esteem of the trade. Watch us grow

BRANCHES AND REFILLING STATIONS:

Warren, Ohio
Chicago, Ill.
Detroit, Mich.
Camden, N. J.
Philadelphia, Pa.
Kansas City, Mo.

San Francisco, Calif.
Buffalo, N. Y.
Atlanta, Ga.
Dallas, Tex.
San Antonio, Tex.
Boston, Mass.

Los Angeles, Calif.
New York City
Syracuse, N. Y.
Minneapolis, Minn.
Toronto, Canada.
Indianapolis, Ind.



FORD REAR Combination Tire Holder, Lamp Bracket, License Holder & Lock

A snug cradle for half the
tires—30x3 and 30x3 $\frac{1}{2}$.

Avoids chafing in spots. No straps to bother. Fills
up the rear bolts to frame. Looks swell.

Complete, \$5.50

On running board, \$5.00. Singles, \$3.50 to \$3.75

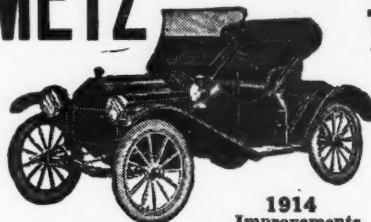
Order thro Jobbers, Ford Distributors or us.
Write for circular.

SMALLEY DANIELS, 803 Woodward Ave., Detroit

METZ "Twenty-Two" Roadster THE GEARLESS CAR

"No clutch to slip—no gears
to strip."

\$475



1914
Improvements

Completely Equipped

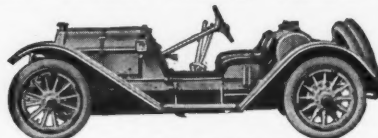
Center control, left-hand drive, 4-cylinder 22 $\frac{1}{2}$ H. P. water cooled motor, Bosch magneto, standard artillery wheels, best quality clincher tires, extension top, windshield, five lamps, gas generator, tools, etc. Makes 6 to 50 miles per hour on the high speed, 28 to 32 miles on 1 gallon of gasoline, and is a wonderful hill climber. A strong, reliable, stylish, fully guaranteed car. You can secure **EXCLUSIVE SALE** in your territory. Write at once for Book "K" and particulars.

METZ COMPANY

WALTHAM, MASS., U. S. A.

M E R C E R

AMERICA'S FIRST GRAND PRIZE WINNER



Series J—Raceabout

The remarkable endurance of Mercer raceabouts is not
accidental. It is the result of conscientious attention
to even the slightest detail of manufacture.

Send for Catalogue

MERCER AUTOMOBILE CO. 800 Whitehead Road
TRENTON, N. J.

STROMBERG CARBURETOR "The Accepted Standard"

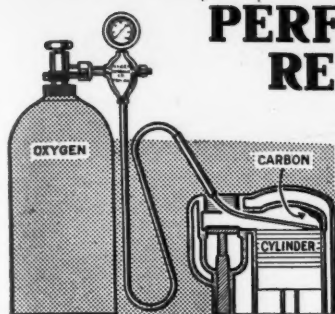
Stromberg Motor Devices Company

54 E. 25th Street, Chicago, Ill.

Branches: NEW YORK, BOSTON, DETROIT, INDIANAPOLIS, MINNEAPOLIS

Pacific Coast Distributors: Chandler & Lyon Company, Los Angeles, Portland, Fresno, Spokane, San Francisco, Seattle

Canadian Distributors: Russell Motor Car Company, Toronto, Montreal, Hamilton, Winnipeg, Calgary, Vancouver



PERFECT CARBON REMOVER \$10

Will remove all carbon from cylinders. Easily and in a few minutes. Equal of any high-priced outfit. All parts guaranteed. Keeps up efficiency of cars and trucks. Big money maker for garages.

To large garages, Oxygen tanks of 100 and 200 cubic ft. capacity are leased. To small consumers a tank of 50 cubic ft. is sold for \$18—thus making the price of the complete outfit \$28. 50 cubic ft. of Oxygen will clean 15 to 20 cylinders. Oxygen costs from two to two and one-half cents per cubic ft. Discounts made to no one.

OXYGEN DECARBONIZER CO., 301 River St., Troy, N. Y.

You can take a thousand miles of service out of a set of tires by driving them insufficiently inflated over ten miles of road.

Use the New Positive Lock Stop

TWITCHELL AIR GAUGE

and save your tires



"TIRE INSURANCE FOR \$1.00"

Simple, Accurate, Durable and Easily Read

For sale by Jobbers, Dealers, Garages, or

The Twitchell Gauge Co.

1201 Michigan Avenue

Chicago, Illinois

SALISBURY

AXLES WHEELS
PROPELLERS

Salisbury Wheel
& Mfg. Co.
JAMESTOWN, N.Y.

WINTON SIX

What's Most Important

Find out, before you buy a car, whether the maker is solvent and is likely to stay solvent. That's more important than to know the specifications of his car. Look up the maker first. Then find out about cars. We have summed up the present situation in the automobile industry in a booklet that you ought to read before you buy any car. Ask for Book No. 41—it includes car description.

THE WINTON MOTOR CAR COMPANY
424 Berea Road, Cleveland, O.

World's First Maker of Sixes Exclusively

REPUBLIC STAGGARD TREAD TIRES

Republic Staggard Tread, Pat. Sept. 15-22, 1908



Among your friends are men—exceptionally keen, shrewd, far-sighted fellows—whose business judgment you respect.

These men are pretty sure to have the Republic Tire on their cars. Ask them what they think of it.

If you do this, your next tires will be Republics.

THE REPUBLIC RUBBER COMPANY
Youngstown, Ohio

Branches and Agencies in the Principal Cities

\$2400

Completely Equipped

More Power
More Flexibility
More Economy
More Silence

MOLINE

KNIGHT

Four-cylinder,
five-passenger,
50 horsepower,
128-in. wheelbase.

Bosch ignition,
Wagner electric
starting and light-
ing, \$2400.

The car of the future will not have poppet valves
Moline Automobile Co., East Moline, Ill.

TOURING CAR \$850

SPEEDSTER \$750

The Vulcan 27
"The World's Greatest Light Car"

1914 is to be the year of the Light Car—the low upkeep car—the VULCAN.

Send for catalog and generous dealers' proposition
VULCAN MFG. CO., Painesville, Ohio Lock Box MA477

PAIGE

Model "36" \$1275.00

A car whose design and construction is so far ahead of others at its price that it is in a class all its own.

Gray and Davis Electric starting and lighting equipment, silent chain cam shaft drive, four inch by five inch motor, cork insert multiple disc clutch, 116 inch wheel base, left side drive, center control, and equipment complete to the last detail.

Model "25" \$975.00

Including Electric Starting and Lighting System

This model has made the Paige reputation. Such a sturdy, powerful, comfortable car has never been offered the public anywhere near its price. \$975.00 with complete equipment.

Splendid Agency Proposition

Paige-Detroit Motor Car Co., 304 Twenty-First St., Detroit, Mich.

Polarine

FRICITION REDUCING MOTOR OIL

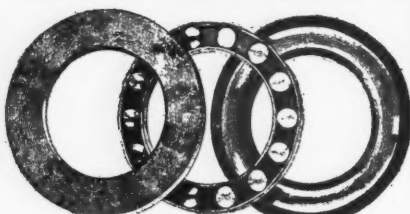
Maintains the correct lubricating body at any motor speed or heat

STANDARD OIL COMPANY
(AN INDIANA CORPORATION)

SHELDON

**AXLES & SPRINGS
ARE
INVINCIBLE**

THE SHELDON AXLE CO.
WILKES-BARRE, PA.
CHICAGO OFFICE. 68 East 12th Street.
DETROIT OFFICE. 1215 Woodward Ave



COMPLETE THRUST BEARING
The Star Ball Retainer Co.
Lancaster, Pa., U.S.A.

Manufacturers of Radial Ball Retainers, Thrust Ball Retainers, Complete Thrust Bearings

WARD-LEONARD SYSTEM

WARD LEONARD



Lighting - Starting

**Faultless Lighting
Infallible Starting**

WARD LEONARD ELECTRIC CO.
BRONXVILLE N.Y.

STEADY AND SURE

In road races and daily service Wisconsin Motors have established a wonderful record for efficiency and endurance. They start easily, run steadily and are always under perfect control.

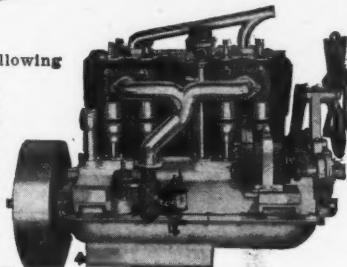
Wisconsin
CONSISTENT

MOTORS

Write for catalog describing following sizes:

3 1/2 x 5"	.....4 Cyl. Enbloc
4 x 5"	.....4 Cyl. Enbloc
4 1/4 x 5"	.....4 Cyl. T Head
4 1/2 x 5 1/4"	.....4 Cyl. T Head
5 1/4 x 7"	.....4 Cyl. T Head
3 1/2 x 5 1/4"	.....6 Cyl. Enbloc
4 x 5"	.....6 Cyl. Three Enbloc
4 1/4 x 6"	.....6 Cyl. T Head
5 1/4 x 7"	.....6 Cyl. T Head

Wisconsin Motor Mfg. Co.
Dept. 25, Milwaukee, Wis., U.S.A.

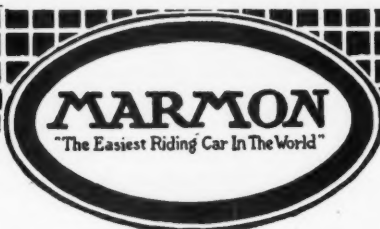


Mechanically perfect—Long diameter crank shaft—Automatic self-contained Oiling system—Extra large bearings.

Why should the auto business be different from any other business? To my mind it is not, and the sooner it gets down to a horse sense basis the healthier it will be. The day when it was a "game" is gone. The red fire and hurrah period is past. And the companies which stay in are the ones which are going to adopt a hard-headed, close-margined, business-like policy.

E. W. Howard

President of The Lexington-Howard Co.
Manufacturers of Lexington "Four," \$1335, and the Howard "Six," \$2375, Connersville, Indiana.



Marmon "48"	Marmon "41"	Marmon "32"
Six Cylinders	Six Cylinders	Four Cylinders
\$5000	\$3250	\$3000

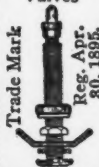
Nordyke & Marmon Co.
Indianapolis (Est 1851) Indiana

Over Sixty Years of Successful Manufacturing

Schrader

For sale by Tire Mfrs., Jobbers and Dealers or
A. Schrader's Son, Inc.
783-791 Atlantic Ave., Brooklyn, New York

Universal
Valves



PAYD MAR 11 '98, JULY 6 '09, OTHER PAT. PENDING
SCHRADER UNIVERSAL
TRADE MARK REG. IN U.S. PAT. OFFICE
TIRE PRESSURE GAUGE

MFG. BY A. SCHRADER'S SON, INC., INDIANAPOLIS

The Clearing House of the Motor Car Industry

*For Second Hand Cars, Surplus Parts, Accessories, Tires,
Machinery & all other Special Announcements of a Similar Character.*

CARS FOR SALE

COUPES

Waverly 3 pass. electric, like new, absolute guarantee, \$600. Rectifier, \$100. Hup "20" Coupe, A1 running order, paint and tires good, \$450.

F. H. RULKOTTER,

819 Windham Ave. Cincinnati, Ohio

FOR QUICK SALE

One new special Metz runabout, wire wheels, duck back, 100-inch wheelbase, enameled blue with 2-inch red panel around top of body and seat, nickel trimmed, luxuriously upholstered, price very reasonable.

STERLING MOTOR CO.,

705 Center Street Brockton, Mass.
Tel. Brockton 190.

Have Exceptional Bargain

In two three-ton White trucks, with 13-foot stake bodies. Just overhauled and repainted; tires like new. Biggest snap ever offered. Original cost, \$3,850 each. Make an offer.

Box 990, Wichita Falls, Texas w

Mitchells, Rebuilt, Guaranteed

These cars are fully equipped. Call or write for further particulars.

MITCHELL AUTOMOBILE CO.,
2334-36-38 Michigan Ave., Chicago

STEARNS, 30-60, OVERHAULED
and repainted, demountable rims, up-to-date in every respect.

CONDON,

2635 Wabash Ave., Chicago.

Usually We Have a Great Variety

of different makes and types of used cars. Some are practically new and have all the latest improvements; some have none of the frills, but are good, serviceable machines.

The Difference Is Mainly in the Price

Ask for our bulletin giving prices.

**PACKARD MOTOR CAR
COMPANY OF CHICAGO**

2367 MICHIGAN AVE.

Specially Made for the Indianapolis
Track Race Prize Winner.

90 miles per hour, special racing
machine\$3500

70 miles per hour, G. J. G. speedster 1275

G. J. G. MOTOR CAR COMPANY
WHITE PLAINS, N. Y.

1—1913 Franklin 5 passenger Model M. (Little
Six).

1—1913 Chalmers 5 passenger Model 36-4.

1—1912 Chalmers 5 passenger Model 30-4.

1—1912 Chalmers 4 passenger Model M-30.

1—1913 Studebaker Six, 7 passenger 40 H. P.

All above cars are in A-1 condition, nice as
new. Write for prices.

LOGAN CARRIAGE & AUTO CO.

Parkersburg, W. Va.

PARTS AND ACCESSORIES FOR SALE

Accessories

Accessories

Money-Savers

High Grade Auto Supplies at a Saving of
25 to 100 Per Cent

Wind Shields, 30 Cents on the Dollar

Zig-zag or rain vision, also clear vision. Single
or double section; black, brass or nickel. All
brand new and of the best material and work-
manship. Guaranteed to be exactly as repre-
sented. Money back if not satisfied.

Tops

New Flanders "20" Touring Car Tops; best mo-
halr; complete with side and storm curtains;
can be made to fit Buick "10" touring cars.

Price, \$11.85

Get Our Prices Before Buying Elsewhere

ERWIN GREER & COMPANY,

1456-64 Wabash Ave. Chicago, Ill.

Accessory Department.

ACCESSORY CATALOG

Mailed on request. Dealers, send list of wants
for special prices. Westchester cup grease bbl.
lots 4c pound. **WESTCHESTER ACCESSORIES
CO., 1777 Broadway, New York City.**

A GOOD WHITE STEAMER ENGINE

Generator and Burner and several other good
parts cheap.

Address BOX E 20, Care Motor Age

A Few Prices on Supplies for Ford Cars

Rubber Pedal Pads (Per Set of 3).....	\$ 0.50
Rubber Mats .....	.75
Hilo Magneto Horn	3.00
Seat Covers (Touring Car)	10.00
Seat Covers (Roadster)	6.00
Fan Belts	2.25
Fog & B. Master Vibrator	3.75
Kellogg Ford Air Starter	52.50
Mayo Spark Plug Pump	7.50

Prices for Short Time Only.
SEND FOR NEW 1914 (UP-KEEP REDUCING)
CATALOG.

CONSUMERS' AUTO SUPPLY CO.

Dept. M.

123 W. Madison St., Chicago

ALL PARTS FOR HALLADAY CARS

Ford and other owners write for tire list,
something interesting.

AUTO PARTS CO.,

Minneapolis,

Minnesota

A TOP, CUSHION OR BACK

New or recovered. Curtains; new lights in
curtains. Carpets, rugs, etc.

NEWTON & SON, Cortland, N. Y.

Attention—Henry Owners

Having purchased the repair business of
the Henry Motor Co., we are prepared
to fill orders promptly for repairs for
Henry cars.

MUSKEGON AUTOMOBILE CO.

MUSKEGON, MICH.

ALLEN'S SUPPLY CATALOGS
Regular and Ford Special. Sent on Request.
Fred Allen Auto Supply Co.,
1610 Michigan Ave., Chicago, Ill.

AUTO REPAIR PARTS

Repair parts for Abbott-Detroit "30" and other
makes. Motors, Frames, Transmissions, Axles,
Springs, Etc. SPECIFY JUST WHAT YOU
NEED, WE WILL QUOTE YOU A REAL
BARGAIN PRICE.

Dequindre Auto Repair Company

474 Larned St., E. Detroit, Mich.

AUTO TOPS BUILT and REPAIRED

Seat covers and body building, remodeling and
trimming. Write for prices.

BITLEY TOP & BODY CO.,

404-410 Laflin St.,

Chicago, Ill.

AUTOMOBILE OWNERS

"G. R. AUTO-FILTER" removes all water and
dirt from gasoline, increases mileage, cuts car-
buretor and engine trouble 80%—Satisfaction
guaranteed.

BOUSMAN MFG. CO.,

Dept. A,

Grand Rapids, Mich.

Annular Ball Bearings Reground

We carry a complete stock of re-
ground bearings of all makes and
sizes, for immediate exchange.

GET OUR PRICES

Ahlberg Bearing Co.,

2640 Michigan Avenue

CHICAGO, ILLINOIS

1790 Broadway

New York City

806 Woodward Ave.

Detroit, Mich.

93 Massachusetts Ave., Boston, Mass.

Automobile Bodies

All kinds of special work, single bodies or
quantity orders. Ford closed bodies, coupe,
sedan and cabriolet. Ford delivery bodies.
Prompt shipment on fore doors.

PAUL MURRAY

1201 State Life Bldg., Indianapolis, Ind.

BALL AND ROLLER BEARINGS

All types and sizes. We also repair or ex-
change all makes of ball bearings. **THE GWIL-
LIAM CO., 253 W. 58th St., N. Y.; 1314 Arch
St., Philadelphia.**

BODIES, WINDSHIELDS, WHEELS, TIRES

1914 New Ford T Roadster Bodies with tops,
\$50 each. Taken off new cars we changed to
delivery cars. Open express bodies \$15 up.
New windshields, clear vision, \$10. 32-inch
solid rubber tires on wheels, only \$12. Slightly
used 34x4 detachable tires \$14; tubes \$8; like
new and firsts.

Benedict, 63 Winder St., Detroit, Mich.

CHAUFFEURS MEMO PAD

Easily attached to steering wheel, special price,
30c. Adjustable Accelerator Heel Rest, \$1.50.
Orders filled promptly. **H. C. RICH, 316 W.
44th St., New York.**

Commercial Bodies for Ford Cars

SEAT COVERS FOR ALL CARS

Write for full particulars

AUTO CAPE TOP CO.,

2334 Michigan Ave.,

Chicago, Ill.

The Clearing House—continued

CLOSING OUT BARGAINS

4"x5 "L" head 4-cylinder motors.....\$198.00
30 H. P. chassis less unit power plant... 135.00
30 H. P. right-hand steering gear complete..... 12.50

G. J. G. MOTOR CAR COMPANY
WHITE PLAINS, N. Y.

Coleman's Waterproof Filler

Will make your auto top waterproof. Guaranteed not to stiffen or change the color. If you cannot obtain Coleman's Filler from your dealer write us direct. Small sample sent by express on receipt of 50 cents.

Virginia Waterproofing Corp.,
Norfolk, Va.

CUT OUTS

E. M. F. Flanders, Buick, Regal, etc. Complete outfit, with brass lock open pedal, \$1.50. Lincoln Machine Shop, Lincoln, Illinois

Detroit Attachable Fore Doors

For E. M. F. Ford, Hudson, etc. One-piece aluminum. Easy to put on.

DETROIT FORE DOOR CO.,
66 E. Ford St., Detroit

DISC CLUTCH OIL

Long and exhaustive tests conducted by many leading disc clutch makers have definitely proved that disc clutch oil is superior to any mixture tried.

Nine-tenths of clutch trouble is due to the improper mixture, either too light or too heavy. Send one dollar for a trial can and prove it for yourself. Agents wanted. Address Dept. 10

TRENT MACHINE CO.,
228 Tyler St., Trenton, New Jersey

Extra—Ford Owners—Catalog

Now ready—FREE 1914 Spring Ford (upkeep reducing) Catalog. New stock of Ford size tires. All guaranteed makes, at cut prices. Write at once.

Consumers Auto Supply Co.,
123 W. Madison St., Chicago

DIRECT FACTORY SALE!

THE WARREN MOTOR CAR COMPANY

are closing out all surplus stock of new auto parts at prices that demand quick sale:

\$ 1.00 Spark plugs.....	\$.19
150.00 full floating rear axle.....	50.00
30.00 front axles.....	12.50
50.00 pressed steel frame—all sizes.....	10.00
100.00 auto bodies.....	30.00
60.00 radiator—many sizes and styles.....	15.00
100.00 magnetos.....	35.00
8.00 iron vises.....	3.19
15.00 electric horns.....	3.98
5.00 complete tool kits.....	1.09
50.00 steering gears.....	12.19
10.00 gasoline tanks—square.....	1.00
18.00 oval and round tanks.....	3.00

Anything else? We have it. Send for a Big Bargain list of new goods being sold at this sale. Get on our mailing list.

Hundreds of other automobile parts and accessories are shown on our Big Bargain Sheet of goods sold at this sale.

WRITE FOR THIS QUICK.

Warren Motor Car Co.,
51 Tenth St.,
DETROIT, MICHIGAN

Fix Up Your Automobile With Boyer's
Air Drying, Glossy Refinisher and Color Finishes—all colors. Write us condition of your car.
BOYER LABORATORY COMPANY,
State and Michigan Sts., Chicago.

Extremely Special

Double comfortable tufted backs with tufted seats, all upholstered in black leather, \$15.00. Set of five black and nickel lamps, consisting of two gas or electric headlights, two oil or electric side lamps, one oil or electric tail lamp, \$15.00.

G. J. G. Motor Car Company
White Plains, N. Y.

FORD ACCESSORIES

Ford fancy cast brass hub caps, which will not dent. Also fancy radiator caps. We make rain-vision hinges that can be attached to your shield. Write today.

ILLINOIS BRASS MFG. CO.,
11 S. Desplaines St., Chicago.

Ford and All Auto Owners

Catalog—Just Off the Press—Catalog
Send for a copy of our latest 1914 illustrated Cut-Price Catalog.

LIBERTY TIRE CO.,
102 Chambers St., New York City, N. Y.

Ford Automobile Specialties

Look for the APCO on the box. If you see this trade mark you are safe in every way, for it means "Every sale a sale of satisfaction." Your money will be cheerfully refunded if you are at all dissatisfied. The APCO goods cost you no more, so insist and don't let your dealer sell you "something just as good" and on which all sales are final. He makes more money, but where do you get off? Remember, if your dealer won't refund your money, we will. You buy APCO and let the other fellow get the imitation. Sold the World Over.

AUTO PARTS CO., Providence, R. I.
The Originators and Largest Manufacturers of Ford Specialties in the World.

FORD DEALERS

Get our catalogue on commercial bodies for the Ford car.

F. E. LORTZ Co., Chicago, U. S. A.

FORD OWNERS

Our pure white felt washers for Ford rear axles stop grease leak. 20c set four, prepaid.
ANGIER'S, Streator, Ill.

Ford, Honeycomb Radiators

This radiator will properly cool any Ford motor and make your Ford a better car. Get our dealers' proposition. Price, \$25.00 f. o. b. Detroit.

**DETROIT RADIATOR &
SPECIALTY CO.,**

965 Woodward Ave., Detroit

FORD OWNERS

Equip your cars with Seat Covers. Our direct to car-owners plan will save you money. Ten thousand satisfied customers last year.

GLOBE SEAT COVER CO.,
Dept. M, RACINE, WIS.

Ford Owners and Dealers!

The TOWNSAN VALVE ADJUSTER AND SILENCER will silence your valves. You can adjust them quickly. Most all jobbers or address

Townsan Auto Specialty Co.,
Mitchell, South Dakota

FORD OWNERS AND DEALERS!
You will save trouble and money by installing our timer elevating device.

FORD PARTS SPECIALTY CO.,
1211 Main St., Richmond, Ind.

FORD OWNERS, "LISTEN"
Write us for commercial and racing bodies. Bucket seats and linoleum covered running boards.
AUTO REMODELING CO.,
1501-5 Michigan Ave., Chicago, Ill.

Ford Owners—Ford Owners

Ask your nearest agent for STAM-FORD Brand Ford Specialties. Accept no other. None better made. Our prices are lower than our nearest competitor. If goods are not as presented, and agent will not refund your money, we will. If your agent cannot fill your wants, send us his name and your order.

JOHN B. STAM & CO.

Manufacturers and Agents
1789 BROADWAY NEW YORK

Ford Owners—Purdy Exhaust Horns
for Fords is being used everywhere—positively will not clog or choke. Write today for catalogue. DEALERS, ask for prices.
Purdy Bros. Co., 49 E. 55th St., Chicago

FORD, HUPP AND MAXWELL
Muffler cut-out, machined ready to attach, including lock open pedal string and cables, \$1.35.
LINCOLN MACHINE SHOP,
Lincoln, Ill.

FORD DEALERS

Get our agency for Ford Spare Wheels. All wheels interchangeable.
"ANGIER'S," Streator, Ill.

FORD RACING FORD
Write us for racing bodies.
AUTO REMODELING CO.,
1501-5 Michigan Ave., Chicago, Ill.

FORD SEAT COVERS

Made of double texture waterproof cloth, edges leather bound. Cover all upholstery and doors. Price, including top hood, roadster \$9.25; touring car \$14.75. Postpaid.

TRUSCOTT AUTO SUPPLY CO.
St. Joseph, Mich.

FORD OWNERS

We can make your car the easiest rider made with light or heavy load; no jolt, no jars, no upthrow. Write us.

Automobile Machine Co., Canisteo, N. Y.

FORD ROADSTER BODY

Complete with top, cushion and side curtains, \$35.00. Dealers only.

MACINNIS BROS., TOLEDO, OHIO

FOR SALE AT A BARGAIN

New 5x6 four-cylinder, governor controlled engine, fully equipped with carburetor, magneto. Will sell for much less than cost. **FRED HANSON, 570 Prior Ave., St. Paul, Minn.**

FOR SALE

New 1914 Top and Body
(never used) for

FORD MODEL T
runabout. This includes curtains, top-hood and cushions, all new. Price reasonable.

PEEBLES MOTOR CAR CO.,

129 West Main Street, Wilmington, Ohio

FOR SALE—ONE 5 H. P. WESTINGHOUSE MOTOR

Single phase, for either 110 or 220 A. C. This motor is in first class condition. Used only six months. Reasons for selling, now have our own plant on D. C. Price, \$120.00, f. o. b. Quincy, Ill.

J. C. NICHOLS MOTOR CAR CO.
Quincy, Ill.

Fore Doors at Cut Prices

Mr. Auto Owner and Dealer: If your car is without fore doors, write today for bargain prices to reduce stock.

DEPT. D

AUTO SPECIALTY MFG. CO.
326-30 E. Market St., Indianapolis, Ind.

FORD OWNERS

Foot throttle or accelerators, \$1.50
Lincoln Machine Shop, Lincoln, Ill.

Fore Doors for All Old Models

PRICES RIGHT
F. E. LORTZ CO.,
1332 MICHIGAN AVE. CHICAGO

The Clearing House—continued

FORE DOOR BODIES

1914 Models, five-passenger, fully upholstered; fit most any car. Cost, \$350.00; our price, while they last, \$85.00. Write for full description.

THE M. & M. COMPANY,
480-500 Prospect Ave., Cleveland, Ohio

GET WHAT YOU PAY FOR

Our Hydrometer tells you exactly what grade gasoline you are getting. Sent prepaid, complete with glass jar and case for One Dollar. 25,000 sold this year. Send for yours today.

MARSHALL, WALTER & CO.,
Milwaukee, Wisconsin.

Get Our Plan for Monogramming
automobiles and motorcycles
by special transfer method
Motorists' Accessories Co., Ashland, O.

Grind Your Own Cylinders

In your own shop. Save money. Make money. Perfect work. Lowest cost. No rotating of cylinders required on the Acme Grinder. Particulars on request.

ACME GRINDER CO.,
2740 Humboldt Ave., So. Minneapolis, Minn.

LEVENE MOTOR CO.

Sole Manufacturers and Distributors of Repair Parts for
Lion Motor Parts Co.,
Louis J. Bergdoll Motor Co.
Midland Motor Co.

We have purchased the entire stock of parts, jigs, patterns, drawings, etc., of the above mentioned companies, and are prepared to fill orders for repair parts for all models of these cars; give name and number of cars when ordering parts. Price list on application.

LEVENE MOTOR CO.,
2200-2218 Diamond St.,
Philadelphia, Pennsylvania

MAGNETOS EXCHANGED

Bought and sold. We repair any make of magnetos and coils.

FORD MAGNETO CO.,

2610 Locust St., St. Louis, Mo.
Telephones: Bomont 65, Central 9570L.

MAGNETOS

We have 2,000 Model X Splitdorf Magnetos; new price, without coil, \$17.50 each; with coil, \$25.00 each. The regular price for these is \$75.00. We also have other makes of magnetos at cut prices—in fact, everything for the automobile. Send for "OUR PRICE WRECKER"—the greatest money saver in the world.

TIMES SQUARE AUTO CO.

1210 MICHIGAN BLVD., CHICAGO, ILL.
S. W. Cor. 56th St. & Broadway, N. Y. City

Make Your Own Welding Plant

In your own shop. We furnish all the castings and parts, also blue prints and instructions. Sent prepaid for \$20.00.

Write us at once.

AUTO WELDING & MFG. CO.
Omaha, Neb.

MOTOR OWNERS, ATTENTION!

National Oxygen Carbon Remover, fully guaranteed, \$10.00. Don't buy unnecessary attachments; we will let you try this machine thirty days.

NATIONAL SALES COMPANY,
210 Midland Building, Kansas City, Mo.

Oxy-Acetylene Welding Plant Designs
Blue prints for building and operating complete apparatus at low cost in your shop.
P. O. BOX 77, "DRAFTSMAN,"
Ft. Ward, Wash.

NOW IS THE TIME!

New Sampson Trucks

1,000 to 1,500 lb. Capacity

We advertised these last week. Sold 15, still have a few left. They have open express, wire screen and panel bodies.

\$700 to \$825

Just One-Half Their Regular Prices

Limited Number of 1½, 3 and 5 ton

Sampson Chasses

\$1,300 to \$2,250

HERCULES One Ton Truck

Express or Stake Body, \$1,250

New Pleasure Cars

Roadster Touring and Limousine ½
Regular Prices.

Used Cars

We have the largest assortment, all in first class running order.

Benz, Packard, Pierce-Arrow, Locomobile, Studebaker, Cadillac, Hudson, Chalmers, Fords, Stearns, Pope-Hartfords, etc., at prices ranging from

\$150.00 Upward

Time Payments Arranged With
Responsible Parties

Bodies, all styles, new bodies, at
25c on the Dollar

Headquarters for Motors—2-4-6 cylinder
at \$95 to \$275.

DISCO SELF STARTERS, FIT ANY
car, complete, \$5.00; regular price, \$40.00.
Send for circulars and our great "PRICE
WRECKER" on accessories and save
money.

TIMES SQUARE AUTOMOBILE CO.

WORLD'S LARGEST DEALERS
56th St. & Broadway 1210 Michigan Ave.
NEW YORK CHICAGO

Peerless Cushion Dressing

Brightens and renews all leather seats
and cushions. Will not wash or rub off.
Dries in twenty minutes. Ask your dealer.

THE COLUMBUS VARNISH CO.,
Columbus, O.

MICHIGAN, MORA AND DRAGON PARTS

We have maintained the exclusive repair parts
business of the Dragon Car since 1907 and on
the Mora Car since 1910. We recently purchased the bulk of the stock and all repair
parts of the Michigan Cars necessary to maintain the best service in this car also.

This stock, together with our unexcelled machine shop equipment, should afford Michigan car owners better service than the makers of the car could give. Our revised price list is now ready for distribution, same will be furnished on application, giving model, style and year of car.

Philadelphia Machine Works
61-71 Laurel Street Philadelphia, Pa.

Protect Your Storage Battery

Hydrometer Syringe for testing Storage Batteries and full instructions for care of batteries, \$1.50 postpaid. **R. & M. SUPPLY CO., Box 437, Des Moines, Ia.**

When Writing to Advertisers, Please Mention Motor Age.

Now Is the Time to Buy High-Grade Tires and Tubes at Remarkably Low Prices

We have on hand a quantity of Casings and Tubes as follows:

31—28x3	Corrugated Non-Skid Casings.	\$ 7.60
18—30x3½	Plain Wrapped Tread Casings.	12.00
98—32x3½	Corrugated Non-Skid Casings.	12.80
60—34x3½	Corrugated Non-Skid Casings.	14.00
6—32x3	Corrugated Non-Skid Casings.	8.70
1—31x4	Plain Tread Casing.	15.00
6—32x4	Corrugated Non-Skid Casings.	18.55
2—36x4	Corrugated Non-Skid Casings.	21.10
3—31x4	Corrugated Non-Skid Casings.	17.90

These Tires are not guaranteed

Inner Tubes—Seconds

70—28x3	Inner Tubes.	\$.90
38—30x4		1.70
91—31x4	or 30x3½	1.73
154—32x4		1.75
19—33x4	or 32x3½	1.83
211—34x4		1.88
119—35x4		1.93
310—36x4		1.97
263—34x4½		2.30
27—35x4½	or 34x3½	2.38
295—36x4½		2.45
55—37x4½	or 36x4	2.53
130—36x5		2.87
134—37x5		2.98

If you find your casing listed, order immediately, as these casings will be sold in a short time and are not guaranteed.

AUTO-PARTS CO.

737-739 Jackson Blvd.
CHICAGO

Peerless Leather Top Dressing

A preserver for all rubber, leather and pantasote tops and curtains. Makes old tops like new. Ask your dealer.

THE COLUMBUS VARNISH CO.,
Columbus, O.

Paint Your Car Yourself

Save \$25 to \$75 by doing the work at home with the Arsenal system. Our big free booklet, "The Car Beautiful," tells how. Send for it today.

Arsenal Varnish Company
Auto Dept. Rock Island, Ill.

PEERLESS LAMP ENAMEL

A black enameled lamp with one coat. Not affected by heat or cold. Does not crack, chip or peel. Made in either a Gloss or Dull Finish. Ask your dealer.

THE COLUMBUS VARNISH CO.,
Columbus, O.

RADIATORS

SMASHED, FROZEN OR INEFFICIENT?
Write **WRIGHT RADIATOR MFG. CO.** and have a better one shipped to you the same day order is received. The only radiator manufacturers who carry in stock hundreds of radiators, all of their own make and guaranteed to be the equal of any radiator made.

WRIGHT RADIATOR MFG. CO.,
8th St., Muskegon, Mich.

RELINERS TO FIT ANY SIZE TIRE
\$1.50 Each.

OGDEN FIBRE GEAR & TIRE CO.,
Columbus, Ind.

The Clearing House—continued

PEERLESS LINING DYE

Makes all faded, stained and spotted linings a black uniform color. Makes old linings like new. Ask your dealer.

THE COLUMBUS VARNISH CO.,
Columbus, O.

RADIATORS

NEW.	NEW.
Ford T.	\$17.00
Buick F, 16, 17, 19, 26, 27, 28.....	30.00
Buick 10, 14, 32, 33.....	22.00
Hudson 20	28.00
Hupp 1910-1911	27.00
Overland	30.00

All other makes at equally low prices. Send us your old radiator for repairs or exchange on a new one.

TIMES SQUARE AUTO CO.,
1210 Michigan Ave., Chicago, Ill.
56th & Broadway, New York City, N. Y.

Peerless Mohair Top Dressing

Waterproofs leaking tops and makes old tops like new. Sold by garages, dealers and jobbers.

THE COLUMBUS VARNISH CO.,
Columbus, O.

RADIATORS

"Put up a good front" by putting on our genuine guaranteed cellular radiators (commonly called Honeycomb).

Ford T	\$25.00
Buick 10-24-25-34-35-36	27.50
Buick 16-17-19-26-27-28	35.00
Buick 21-38-39-43	37.50

Equally attractive price on all popular models. Every one a new, complete radiator. Five per cent discount allowed for cash with order.

Detroit Radiator & Specialty Co.
963 Woodward Ave., Detroit, Mich.

Real Bargains for Prompt Delivery

DELIVERY
40-foot Prest-O-Lite gas tanks, new, filled, complete, worth \$25, for \$13. Motorcycle size, worth \$10, for \$7.70. Lighter and patent burner cleaner free with each order.

Cut Price Gas Tank Sales Co.,
198 W. Water St., Milwaukee, Wis.

Repairmen and Garages

If you have a carbon burner we can supply finished equipment so you can use it for welding—at a cost not to exceed \$25.00. Write at once, care Manager,

AUTO WELDING & MFG. CO.
Omaha, Neb.

Repairing Tires with a Maburn Superior Vulcanizer is Simplicity Itself.
Write for catalogue
MAPES & BURNS MFG. CO.,
Dept. A, 16 Fulton Ave., Rochester, N. Y.

Removed to New and Larger Quarters

Splitdorf 4 cylinder magnetos, models T and D.....	\$20.00
Schebler carburetor, model L, used but in perfect condition.....	6.50
4 speed transmissions, new, Warner	70.00
Buick model 17 radiators, new.....	30.00
34x4 Fisk casings and tubes, used but good for 3,000 miles.....	14.00

Send for list of other bargains

Automobile Appliance Co.
1436-38 Michigan Ave.,
Chicago, Ill.

RECTIFIERS

To charge from A-C circuit 1 to 8 ignition. Lighting or starting batteries at one time; \$12 and upwards. **AMERICAN BATTERY CO.,**
1124 Fulton St., Chicago.

SAFETY FIRST

Do not take a chance with poor brakes. 2" brake bands, with Raybestos lining, for any size drum, \$1.25.

PURITAN MACHINE COMPANY
Lafayette Blvd. & 10th St., Detroit, Mich.
All parts—All cars.

"Safety First"

Most accidents are caused by "cloudy" glass fronts. Our patented glass front cleaner removes rain, snow and "breath-steam" from windshields instantly. Made of brass; cannot rattle; always ready; operates from driver's seat. Send two dollar bill for one today and be safe. Tomorrow you might have accident costing two thousand, maybe life.

MARSHALL, WALTER & CO.,

Milwaukee, Wisconsin

SAFETY FIRST

Wheels—All Sizes—\$3.00 each

PURITAN MACHINE CO.

Lafayette Blvd. & 10th St., Detroit, Mich.
All parts—All cars.

Truffault-Hartford Shock Absorbers

\$45.00 kind; \$20.00 set of four.
PURITAN MACHINE COMPANY
417 Lafayette Blvd. Detroit, Mich.

Shinauto, the Great Preserver

Keeps auto like new without washing. Prevents cracking and checking of varnish. Makes old cars like new. Guaranteed. Saves paint bills. Trial can 50c by mail. Enough for two months' treatment.

SHINAUTO MFG. CO., INC.,
1137-39 N. Illinois St., Indianapolis, Ind.

Speedometers Speedometers

Special prices to Ford owners for all makes of Speedometers and Parts.

GENERAL SPEEDOMETER REPAIR COMPANY
53 West 63rd St. New York City

TEST YOUR GASOLINE
Hydrometer, complete, glass test tube and carrying case, seventy-five cents postpaid.
R. & M. SUPPLY COMPANY
Box 437, Des Moines, Ia.

STOP THAT LEAK
In your radiator with one ounce of Overton's Radiator Leak Compound. A pound can by parcels post for 50c cash. Prices to dealers.
N. L. Overton, 1109 4th Ave., Council Bluffs, Ia.

"STOP THIEF"

Patented lock for Ford and other small cars. Impossible to start motor. Two keys with each lock. Sent prepaid, \$1.50. May save price of your car. **MARSHALL, WALTER & CO.,** Milwaukee, Wisconsin.

THOMAS CAR OWNERS

Write us about repairs, replacements and new cars.
E. R. Thomas Motor Car Company
1200 Niagara St. Buffalo, N. Y.

Tops Built, Recovered and Repaired

Also top covers, radiator covers, luggage cases, celluloid, etc.

C. G. MEYER & SON, Tiffin, Ohio

Touring, Roadsters, Racing Bodies
Seats, special and stock sizes. Radiators, hoods, tanks and fenders for any car. Get our prices.
AUTO SHEET METAL WORKS
1534 Michigan Ave. Chicago, Ill.

That Mysterious Rag Duster

For dusting and polishing automobile bodies, windshields, lamps, pianos or any other polished surface. House Size 25c. Automobile Size 50c. Sent to any address upon receipt of price. If not satisfied, return duster and we will refund purchase price.

THE GEM SUPPLY,
1036 So. Main Street, Waterbury, Conn.

WESTON MOTT HIGH-GRADE REAR AXLES, \$45. Other bargains, too
Puritan Machine Company
412 Lafayette Blvd. Detroit, Mich.

Truss Rod for Ford Cars

Necessary to prevent sagging or breaking of rear axle under heavy load or on rough roads. Easily applied. Hundreds in use. Guaranteed two years. Price \$2.50. Live dealers wanted.

SPECIALTY SALES CO.,

401 Merchants Laclede Bldg., St. Louis, Mo.

We have several slightly used Magnetos which we will sell very cheap

LUVERNE AUTOMOBILE CO., Luverne, Minn.

We Make Ford Racing Type Bodies

In several models for immediate delivery.
AUTO SHEET METAL WORKS
1532 Michigan Ave. Chicago, Ill.

Welding Plants That Are Safe

\$50.00 to \$175.00. Carbon Remover with each welder. Your credit is good with us. The welder pays for itself and you save the middleman's profit. Write for terms. Address Manager, Dept. G.

Bermo Welding Apparatus Company
Omaha, Neb.

We Tear 'Em Up and Sell the Pieces

We want old autos, condition no object. We will buy anything for the auto. We have all kinds of parts, many of them new, at unheard of low prices. Tires and tubes, many new, others used. Kingston carburetors, all sizes; will exchange for others. Gears of all kinds, new gas oval tanks, new timers, magnetos, coil. Stewart speedometers, shafts and chains, tire covers, dust hoods, electric horns, new brass bumpers, lamps, all kinds; Prest-O-Lite tanks, oilers, cylinders, pistons, transmissions, crankshafts, seats and bodies; new 30x3 1/2 wheels, many other used sizes; rims; several chassis without engines; 2-cylinder, 4-cylinder, 6-cylinder engines; springs; in fact, everything that an auto needs. Correspondence solicited. If we do not have it, will advise you where you can get it. Anything bought can be returned at once, unused, carriage prepaid, and we will refund amount paid.

AUTO WRECKING CO.,
Old Church, 13th and Oak
KANSAS CITY, MO.

The Clearing House—continued

"SAVE YOUR GASOLINE"

We have 150 Rayfield carburetors, regular \$20 kind. Our price \$8.20 while they last. Puritan Machine Co., 415 Lafayette Blvd., Detroit, Mich.

50 New Pressed Steel Frames

163" long, 34" wide. Each, \$10.
Send for Sketch.

LUCAS & SON, Bridgeport, Conn.

50% ON THE DOLLAR

120 Gal. Bowser gasoline tank; Dalton Adding Machine; 100 new assorted plugs, all makes, 12½¢ each. STURDY MFG. CO., 2637 Michigan Ave., Chicago.

6-80 Batteries, \$8.00 Each

1 Model N Ford engine, \$50.00; 50 H. P. Pope-Toledo engine, \$125; 4-cyl., 20 H. P. Thomas motor, \$100.

All Pope-Toledo parts.

AUTO SALVAGE CO.,

1436 Wabash Ave., Chicago

CYCLE CAR ACCESSORIES

STEERING KNUCKLES

Yokes, front axles, springs, wheels and friction transmissions.

Minneapolis Motor Co. Agency

1123 Michigan Ave. Chicago

V pulleys 1½x7, also flat belt pulleys 2x7

F. MACVICAR,

214 Milton Avenue Syracuse, N. Y.

PARTS AND ACCESSORIES

WANTED

WANTED

To Buy Prest-O-Lite Gas Tanks

for cash. Also automobile supplies of all kinds. Please state lowest price you will sell for. I pay cash on delivery.

WALTER R. EBERT

959 34th St., Milwaukee, Wis.

HELP WANTED

Auto Accessory Salesman Wanted

to sell our guaranteed auto tire reliners, double locks, inner and outer shoes, etc. Liberal commissions and exclusive territory.

American Rubber Products Company
5625 So. Blvd., Austin, Chicago, Ill.

We Are Constantly in Touch
with employers requiring High-Grade Engineering service. Are you listed with the
TOLEDO ENGINEERING AGENCY
Toledo, Ohio

WANTED---AGENTS

AGENTS

High Grade Auto Necessity

100% profit. The Perfect Auto License Holder, weighs 8 ounces. Every auto owner a prospect. Placed on car without tools in 2 minutes. 25 sets sold daily easily. Send 25¢ for agent's sample pair to

THE CORNELIUS AUTO SALES CO.
Toledo, Ohio

Exclusive and Side Line Salesmen
for spark plugs and accessories. Well established. Good chance for right man.
STURDY MFG. CO.

2637 Michigan Ave.

Chicago

American Gasoline Saver

Exclusive territory to live agents. A quick seller—guaranteed to save 25%. Retail price only \$5.00. Send for agents' discount.

American Rubber Products Co.,

5625 So. Blvd., Austin, Chicago, Ill.

PORTABLE GARAGES

PRIVATE GARAGES

Galvanized steel or wooden. The finest line offered. If interested write.

Garage Factory, Beaver Springs, Pa.

TIRES

A1 GUARANTEED TIRES

What make do you use? What size?

Write for my price bulletins

We pay express charges

ALLEN S. SINSHEIMER

1503 Michigan Ave. Chicago, Ill.

Auto Tires Recovered as Follows

30 x 3	\$5.80	32 x 3½	\$7.80
30 x 3½	7.20	34 x 4	9.65
36 x 4½	\$12.00		

Non-Skid Treads applied from \$1.00 to \$3.00 extra. Workmanship and material guaranteed. A trial will convince. Repairing tires since 1896.

JUNGKIND & VOGLER

158 Chambers Street, N. Y. City

Branch 1100 Bedford Avenue, Brooklyn, N. Y.

I Will Sell You Clincher

or straight side tires, either firsts or seconds, cheaper than anyone in the United States.

D. OGDEN, Columbus, Ind.

GUARANTEED TIRES DELIVERED DON'T PAY MORE

30x3, \$9.10; 3½, \$12.25; 32, \$13.15; 33x4, \$16.85; 34, \$17.60; 35, \$17.95; 35x4½, \$23.95. All sizes and non-skid. 10% with order for 2 tires; we deliver.

VANDERPOOLS,

Springfield, O., Jacksonville, Fla.,
Los Angeles, Calif.

Rock Bottom Prices

On Tires, Tubes and Reliners. New and used. Write for prices.

ACME TIRE & REPAIR CO.,

1547 Michigan Ave. Chicago
Phone Calumet 3127.

TIRES

Twenty-two years in the rubber business. It is the reputation that counts. Expert tire repairing. The best equipped shop in New York. Manufacturers for U. S. and Canada for the famous Samson Tread. Distributors for all standard makes. Get our prices before buying.

H. PHILLIPS RUBBER WORKS

1989 Broadway, N. Y.

9087 Columbus

Tires—New, Fresh Stock

28x3	\$ 6.80	34x3½	\$10.50
30x3	7.10	34x4	15.00
32x3½	10.90	34x4½	18.70

All other sizes in proportion.

SERLIN TIRE CO.,

1073 14th Place Chicago, Ill.

TIRES, HEAVY CAR TYPE

Guaranteed factory-perfect, regular firsts; factory seconds, blemished and repaired tires. Cheaper than any house in the country.

ACME TIRE CO.,

296 Broadway Buffalo, N. Y.

TIRE DEALERS AND GARAGEMEN!

Write for our special tire bulletin on blemished tires. We are the lowest priced house in America on this class of goods.

TIRE SALES CO., Buffalo, N. Y.

MAGNETOS

All Makes of Magneto & Coils

repaired, bought, sold and exchanged. Service station for Simms, Michigan and National. Mail orders given special attention.

Get our prices before going elsewhere
HECHT MAGNETO EXCHANGE

228 West 49th Street New York

BOSCH MAGNETOS

Prices are low
DUAL, DUPLEX AND INDEPENDENT
BROWN & CAINE

1517 Michigan Avenue Chicago

MAGNETOS

Repaired, remagnetized; prompt service on all makes. Get our exchange proposition on new K-W for old equipment.

Spark Coil, Storage Battery and Carburetor Repairs.
Northwestern Distributors.

K-W magnetos, Schebler carburetors. Vesta lighting equipments.

Kellogg Self Starters and Tire Inflators.

REINHARD BROTHERS CO.,

Minneapolis, Minn.

IGNITION & STARTING REPAIRING

A. A. A. Starting and Lighting Systems
and storage battery repairs; experts on all systems.

Auto Electrical Trouble Station

1074 Boylston St. Boston, Mass.

We Are the Oldest

And largest magneto repair firm in the country. All makes of magnetos and coils repaired, sold and exchanged. Write for prices.

PELLET'S MAGNETO EXCHANGE

1606 Michigan Ave., Chicago, Ill.

Starting and Lighting Systems

and storage batteries overhauled and repaired. We charge no more for expert service than other concerns do for novices at the business. Rewinding of all kinds. Established in 1904.

PREMIER ELECT. CO., Not Inc.,

1123 So. Wabash Avenue Chicago
Tel. Wabash 4884.

REBUILDING AND REPAIRING

Automobile Cylinders Reground

New piston and rings fitted. Garage Air Compressors.

Cast Iron Brazing Co., Manchester, N. H.

AUTO SPRINGS REPAIR CO.

We manufacture and repair springs. Proper action compound put in springs.

1331 Jackson Boulevard, Chicago, Ill.

ANDRE G. CATELAIN

General machine work for foreign and American cars. Welding all kinds of metal. Everready Automatic Engine. Starter Sales and Service.

Manufacturer Catelain Hose Coupling

1446-8 Indiana Avenue Chicago
Tel. Calumet 1187

The Clearing House—continued

Carbon Removed From Cylinders
 4 cylinders.....\$3.00
 6 cylinders.....4.50

ANDRE G. CATELAIN

1446 Indiana Ave. Chicago

CYLINDER GRINDING

The better quality. Perfectly balanced motors guaranteed with our regrinding and new pistons. Scored cylinders filled and reground. Welding repairs of all descriptions.

OXY-CARBI CO.,

398 George Street New Haven, Conn.

CYLINDER REBORED

Including piston and rings.....\$7 to \$11

STERLING ENGINE CO.

331 So. Clinton Street Chicago, Ill.

CYLINDERS REGROUND

We have special equipment for regrinding cylinders, fitting new pistons and rings. Prices, \$7 to \$15 per cylinder.

Autogenous Welding

Magneto and Battery Work

Prompt Service

BERNHARD & TURNER AUTO CO.

Des Moines, Iowa

CYLINDERS REGROUND

and fitted with new pistons and rings for \$7 to \$11 per cylinder. We do this class of work exclusively and are thus able to give you the highest class of work at these prices.

CROWN MACHINE SHOP

Crown Point, Ind.

FORD

Cylinder Grinding

New Pistons, Rings, Pins

Our special equipment for grinding Ford Model T cylinders enables us to fit new pistons, new rings, and piston pins on short notice. A complete job better than new at prices that will interest Ford dealers as well as owners.

Write at once to

AUTO ENGINE WORKS

St. Paul, Minn.

GARDEN CITY SPRING WORKS

**NEW SPRINGS AND REPAIRS
FOR ALL CARS**

2302 Archer Ave., cor. 23d and Canal Sts.

CHICAGO, ILL.

Telephone Calumet 1081

Have Your Cylinders Rebored

And reground and fitted with my racing pistons and my new patent leakless rings. Guaranteed to give 35 per cent higher speed, power and economy. Also make gears of all kinds and push rods and piston pins of chrome nickel steel, hardened, tempered and ground, superior to factory; also cranks, connecting rods, crank cases or any part, and make special motors; send parts to the shop of quality.

McCADDEN MACHINE WORKS

St. Cloud, Minn.

CYLINDERS REGROUND

And fitted with new pistons and rings for \$15 per cylinder. We make parts and cut gears of all kinds. Send us your old parts and we will repair or duplicate them in record time. Cracked cylinders, gear cases, etc., welded and made good as new. Aluminum, bronze and brass castings of every description.

THE ADAPT MACHINERY CO.,

1624 Wabash Avenue, Chicago, Ill.

RADIATOR AND LAMP REPAIRING

A. A. A. Radiators Manufactured

Any make repaired and returned same day. Radiator to fit any car shipped in 3 days.

Sheppard Co., 1331 Jackson Blvd., Chicago

Arrow Radiator Repair Co.

1331 Wabash Ave., Chicago, Ill.

Expert repair work on Radiators, Hoods, Fenders, Dashes, Tanks and Drip Pans

We guarantee all our work.

Phone Calumet 1995

All Kinds of Auto Radiators

hoods, fenders, lamps, windshields, etc., rebuilt and repaired. All work guaranteed. Phone or mail order.

L. BLUMENFELD & CO.,

1919 Wabash Ave. Chicago
Telephone Cal. 4583

Before Ordering Elsewhere

Get our prices on new radiators, hoods, fenders and tanks. When you have a badly damaged radiator that nobody else can repair, or a radiator that needs a new core, send it to us. All work guaranteed.

Illinois Auto-Sheet Metal Works

58-60 E. 16th St., Chicago, Ill.

Tel. Calumet 1191.

CHICAGO MFG. CO.

1466 Michigan Avenue, Chicago
We are the only radiator manufacturers in Chicago making a square tube radiator. New guaranteed cores placed in old radiators. We also manufacture Hoods, Fenders, Tanks and Pans and do guaranteed repair work. Prompt service.

ONLY RADIATOR FACTORY IN NORTHWEST

Pioneer manufacturer. Why send your radiator down east when you can ship it to us; save time, express, freight, money, and get best workmanship. Prices right. Make new radiators; allow for old one.

TODD MANUFACTURING CO.
820-824 Mary Pl. Minneapolis, Minn.

The M. & L. Auto Sheet Metal Works

Rebuild and repair radiators, hoods, fenders, tanks, lamps, etc. Tel. Calumet 2348.

1551 Michigan Ave., Chicago, Ill.

WELDING

Advance Welding Machine Co.

Welding of All Kinds of Metals.
Cast Iron and Aluminum a specialty.

525 West Jackson Boulevard

111 N. Desplaines Street

CHICAGO, ILL.

Phones: Monroe 3937; Auto 36-102.

AMERICAN WELDING CO.

2637 Michigan Ave., Chicago

Autogenous welding of all metals, such as crank cases, cylinders, etc. We positively guarantee all work. Tel. Calumet 3563.

AUTOGENOUS WELDING

Expert Welders on Automobile Parts.
Reliable Welding Outfits for Repair Shops and Garages.

— \$45 —

C. SORENSON,

18 East 16th Street Chicago, Ill.

BRAZING & WELDING CO.

of Chicago

All metals brazed and welded are guaranteed. Experts on aluminum welding. Send for circular on aluminum welding.

1615 Wabash Avenue

Tel. Calumet 5286.

BROKEN CRANKSHAFTS

Crankcases, cylinders, flywheels, gear-teeth, pistons perfectly welded and machined, ready to replace. Scored cylinders made new. Booklet.

ATLAS WELDING WORKS,

Rahway, N. J.

OXY-ACETYLENE WELDING

Cast Iron, Steel and Aluminum, etc. Cylinders, Crankcases and crankshafts a specialty. Engines, transmissions, etc., overhauled. Cylinders rebored with new piston and rings, \$7 up.

COMET MOTOR WORKS,

564 Jackson Blvd. Chicago

WELDING

Cylinder crankcase and crankshaft welded. Cylinders rebored, \$7 to \$11 a cylinder, including piston, 8 rings.

STERLING ENGINE COMPANY

331-333 S. Clinton Street Chicago, Ill.

We Weld and Absolutely Guarantee

Our welds to hold, cylinders (cracked in or outside), crankshafts, aluminum crankcases, transmission cases, housings, etc., by the Ox-weld process of welding and cutting metals.

Estimates furnished for job or repair welding and cutting operations of all kinds. Oxweld Acetylene Co., 37th and Jasper Pl., Chicago, Ill. Downtown receiving station, 557-561 W. Jackson Blvd.

PATENTS & PATENT ATTORNEYS

INVENTIONS EXAMINED

Patent and working drawings made. Models developed and built. Free report as to patentability and cost for development of your invention.

Address Inventions, Dept. A
TOLEDO ENGINEERING AGENCY
Toledo, O.

Patent Your Invention

First get our square deal fee plan; free book and free search; \$10,000 offered for one invention wanted.

MILO B. STEVENS & CO.,

53 W. Jackson Blvd., Chicago

Established 1864. Main office, Washington

Patent your Invention through

F. V. WINTERS

M. E. and Patent Lawyer

Thirty years' experience in mechanical and electrical patents. Automobile inventions usually successful.

125 East 23d St., New York City

The Clearing House—continued

C. L. Parker, Patent Attorney
Formerly member Examining Corps, U. S. Patent Office. 960 G St., Washington, D. C. Pamphlet of instruction sent upon request.

RALPH N. FLINT, M. E.,
Attorney-at-Law in Patent Cases; late Assistant Examiner Internal Combustion Engine Division, U. S. Patent Office. Specialist in Internal Combustion Engine Cases.
15 William St., New York

MAILING LISTS

AUTOMOBILE ADDRESSING
and Mailing Lists; card systems, any section, any make.
AUTO LIST & ADDRESSING CO.
Buick Bldg., New York City, N. Y.

Automobile Lists
of owners, dealers, etc.; any state.
AUTO DIRECTORIES COMPANY
1717 Broadway, New York City

Colorado Motor Registrations
First lists available under new law. Automobile registrations furnished weekly during entire year 1914 for \$60. Also have dealers and motorcycles.
E. K. MERRITT,
1560 Race St.,
Denver, Colo.

GET LIST OF AUTOMOBILE REGISTRATIONS
Direct from State House. Quickest and best daily service. \$45.00 for entire year, or at rate of \$4.00 per month. Special lists of all kinds promptly compiled.
DONNELLY,
Box 180 Albany, N. Y.

A COMPLETE LIST OF
Auto Dealers—19,792—\$30 or \$3 per M by states.
Ford Dealers—2,990—\$10 or \$5 per M by states.
Garages—13,515—\$25 or \$3 per M by states.
Repairs—8,466—\$15 or \$3 per M by states.
Supplies—6,964—\$12 or \$3 per M by states.
Auto Mfrs., U. S. and Canada—626—\$3.
644 Auto Dealers, second-hand—\$4.00.
14,000 Auto Truck Owners—\$3.50 per M.
AUTO OWNERS in majority of states is \$2 per M, in lots of 1 to 10 M. Larger lots price is interesting.
FORD OWNERS in most states is \$3 per M; some states price is higher.
WRITE US YOUR NEEDS.
All dealers, garages, supplies, manufacturers and repairs are typewritten and show financial rating.

Trade Circular Addressing Co.,
166 West Adams St.
Phone: Franklin 1183 Chicago, Ill.

LIST OF ILLINOIS AUTOMOBILE REGISTRATIONS
Direct from State House. List compiled and mailed weekly. Write us before placing your order elsewhere. \$30.00 per year.
SPECIALTY SALES CO.,
Box D, Rochester, Ill.

Mailing Lists and Statistics
Owners or dealers; any state, county, city; weekly and monthly supplements at lowest prices. Special lists of electrics, trucks, Fords, Studebaker, Overland, etc.
MOTOR LIST CO. OF AMERICA,
220 News Arcade,
Des Moines, Iowa.

MAILING LIST
Canadian Automobile Owners
THORNTON
308 Beveridge Bldg., Calgary, Alta., Can.

New Jersey Auto Registrations
Send for sample page and get list from reliable party right in Trenton. Daily service only \$80 for entire year 1914. H. J. Tindall,
47 W. State St., Trenton, N. J.

NORTH CAROLINA AUTOMOBILE OWNERS
Up-to-date lists. 12,000 names. \$15. Address
Address W., Box 426 Raleigh, N. C.

Ohio Automobile Registrations
Arranged by counties, compiled by printers of official Register. Installments monthly. Write for prices.

THE EDW. T. MILLER CO.,
Publishers and Printers
Columbus, Ohio

OREGON

Sixteen Thousand 1914 registered motor vehicle owners. Business address; make, style of vehicle. Monthly publication \$3 per year. Multnomah County Credit Sheet \$1 per month. Daily registration cards, \$5 per M.

M. O. WILKINS,
326 Mohawk Portland, Oregon
Weekly List of 1914 N. E. Car Owners \$10.00 yearly. Price of Mass. list, classified by cities and town, on application.
AUTO LIST PUBLISHING CO.
138 Pearl Street, Boston

AUTOMOBILE BOOKS AND MAPS FOR MOTORISTS

A. L. DYKE'S
Auto Instruction
A new idea of instructing you with working models to care for and repair automobiles. Simplified instruction on self-starters and lighting just added. Send for free 32-page illustrated booklet.
A. L. DYKE,
Box 16 Roe Bldg., St. Louis, Mo.

THE PRACTICAL HAND BOOK
of Gas, Oil and Steam Engines.
Send for complete circular.
Charles C. Thompson Co.
1130 S. Wabash Ave.,
Chicago, Ill.

FORD INSTRUCTION BOOK,
Every part fully explained. Repair your own car. Sent postpaid, \$1.00, particulars free.
J. CLARK, 308 Elizabeth St., Peoria, Ill.

Ford Model T Reference Book
Second edition. A manual on care, repair and operation. Makes you master and mechanic of Ford Model T. Details dismantling and assembling of its mechanical parts. Troubles located and readily remedied by digest index. Circular on request, or sent postpaid, \$1.00.

FORD REFERENCE BOOK CO.,
57 W. 125th St., New York, N. Y.

Parts and Accessory Makers.
The motorcycle field is well worth your attention; 75,000 new machines in 1912. Leading medium.

Motorcycle Illustrated,
51 Chambers Street, New York City
Paid circulation over 8,600.

AUTOMOBILE SCHOOLS

AAAA—Come to Detroit
The "Automobile Center," and learn the business in the largest and best equipped school in the country.
MICHIGAN STATE AUTO SCHOOL
"The Old Reliable School,"
11 to 19 Selden Street, Detroit

THE AUTOMOBILE BUSINESS
Offers Wonderful Opportunities

We are placing men from all parts of the country in good paying positions. Send for Booklet A.

STEWART AUTO SCHOOL,
223 West 57th Street New York City

Learn to Earn \$100 to \$200 per Month

Free booklet, "How to Succeed in the Automobile Business," on application. A Greer diploma guarantees efficiency and protects the life of your employer. Largest motor college in the world—1400 graduates—\$40,000 in modern equipping—eight instructors—100 rebuilding cars—actual work, repairing and driving. Day and evening classes—many owners and dealers employ Greer graduates only.

GREER COLLEGE OF MOTORING
1456 Wabash Ave., Chicago

Opposite Coliseum Phone Calumet 327

COME TO DETROIT
Learn the Automobile Business
Learn to Be a Machinist
A Complete Repair Course
\$15.00
The Largest College in the State
ROCK'S AUTOMOBILE COLLEGE
256 Cass Ave.,
Detroit, Mich.

LEARN REPAIRING
On every make, driving on dozens of cars, starting and lighting, with largest equipment in America; steam vulcanizing, oxy-acetylene welding and everything known to this business. A \$20 to \$50 course brings you \$1,000 to \$2,500 a year.
Academy of Automobile Engineering,
1452-54 Michigan Ave., Chicago, Ill.

MISCELLANEOUS

Collections

Special and prompt attention given to automobile accounts. Claims of all kinds and from any locality solicited on percentage.

J. L. MURRAY, Attorney,
19½ N. Meridian St., Indianapolis, Ind.

STAMPINGS

Metal spinnings and stampings a specialty. All sorts of die work and metal patterns. Manufacturers of specialties and novelties. Experts in black enameling. We specialize in making up metal spinnings before dies are made, showing how stampings will look. Prices reasonable. Work guaranteed. Prompt delivery.

The Standard
Spinning & Stamping Co.,
TOLEDO, OHIO

The Clearing House—continued

AUCTION

Commencing Thursday, April 30th, and continuing until sold (which is expected to take three days) we will sell at public auction the entire plant of the

American Motors Co; Indianapolis, Indiana, Bankrupt

We will start the sale promptly at 10 A. M. on the Good Will of the bankrupt concern, which consists of the right to use the name, charter, franchise, blue prints, orders, list of car owners, etc.

Automobiles

35—1914 6 Cylinder Touring Cars, 5, 6 and 7 passenger, brand new and fully equipped.

20—New 1914 American 4 cylinder "Scouts."
10—1914 6 and 4 cylinder Roadsters, fully equipped, second hand.

1—Mars Truck.
1—Oldsmobile "Special."
6—Service Cars and Trucks.

Parts Etc:

Over \$250,000 worth of standard parts, accessories, material, etc.

Machinery

Over \$100,000 worth of fine machinery, consisting of Automatics, Grinders, Millers, Lathes, Screw Machines, Shapers, Planers, Keyseaters, Tinnners' Tools, Electrical Machinery, Woodworking Machinery, Drills, Drill Presses, etc.

Over \$30,000 worth of Fine Tools. Also all Fixtures.

All of the above will be sold in lots to the highest bidder for cash. A deposit of 25% will be required from each purchaser. Positively no checks accepted unless certified.

Full particulars of this sale can be had by inquiries made at office of undersigned auctioneers.

No catalogues are being issued and we advise all prospective purchasers to take advantage of inspection days, which start on the 27th.

This stock will be sold in piecemeal only, and will not be offered in bulk. Please bear in mind that the sale takes place at Indianapolis.

SAMUEL L. WINTERNITZ & COMPANY, Auctioneers, CHICAGO, ILL.

To Motor Manufacturers

The representative of a wealthy Motor Co. is at present in New York for the purpose of arranging Sale Agencies in Great Britain for high grade American accessories. Firms desiring representation should write to A. W. Burch, Box E 91, care Motor Age, during the next ten days. London address, Harmons' (Motor Agencies) Ltd., 24 Great Pulteney St. W.

Read
**MOTOR
AGE**



SPROCKETS

Chains and Differential
IN STOCK OR ORDER

SEND FOR NEW CATALOG

CULLMAN WHEEL COMPANY
1341 Altgeld Street Chicago

Hoyt Electrical Instrument Works

Makers of

**HOYT AMMETERS
AND VOLTMETERS**

Penacook,

New Hampshire

New Catalog

READY IN
MARCH

MOTOR CAR
MOTOR CYCLE
MACHINISTS'
BICYCLE

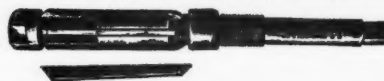
SUPPLIES

and BICYCLES

Wholesale Only DEALERS, GET
YOUR NAME IN

Motor Car Supply Co., 1451-1453-1455
Michigan Ave., Chicago

IF YOU TRY ONE YOU WILL WANT MORE Critchley's Expanding Reamer



Reams
Odd-Sized
Holes

CHADWICK & TREFETHEN,

PORTSMOUTH, N. H.

SUPPLIES

Dealers, send for our 1914 catalogue, just out. New goods, new prices, prompt shipments. A few Fisk casings, 36x4, Q. D. Clincher Heavy Car Type, while they last, at \$17.00 each.

CHICAGO AUTOMOBILE SUPPLY HOUSE
1355 S. Michigan Blvd., Chicago, Ill.

AUTOMOBILE TURNTABLES

T. C. BEACH AUTO-TURNTABLE CO.

310 Lansing Street
ST. JOHNS, MICH.

50 Church Street
NEW YORK

BOILERS

FOR STANLEY STEAM CARS. Also Grout, Prescott, Locomobile and Mobile Boilers, all guaranteed to fit. Special boilers 4 to 60 h. p.; repair work.

Steam Carriage Boiler Co., Oswego, N. Y.

Classified Advertising

Rate 25¢ a Line

Cars For Sale

A BARGAIN—UNUSED FOUR CYLINDER ton and a half truck held by bank. Will sell for \$1,200.00 cash. Address Union National Bank, Muncie, Ind.

AUTOMOBILE OWNERS, ATTENTION— Magnetos and Ignition. Coils of all makes repaired; prompt service to parcel post orders. 60 Bank St., Newark, N. J.

FOR SALE—A BARGAIN. ONE HAVERS six-sixty, five-passenger touring car; electric system and full equipment; run 2,000 miles. Write or call for full information. W. E. Schaefer & Sons, Ripon, Wis.

FOR SALE—TWO LIGHT AUTO TRUCKS, 1 20-horse, 2 cylinder air-cool truck; 1 20-horse, 2 cylinder, water-cool truck. John-son Transfer & Fuel Co., Bloomington, Ill.

MODEL F 7-PASSENGER STODDARD— Dayton. Perfect condition except tires. \$450. A guaranteed bargain. F. E. Alford, Goshen, Ind.

PACKARD AUTOMOBILE, 7-PASSENGER, in first-class condition and appearance; recently overhauled and repainted, \$750; bargain for quick disposal. R. L. Chalfant, 1314 North 44th St., Philadelphia, Pa.

RACE CAR 281 CUBIC INCH. 85 MILES per hour, Sheridan, 3306 Park Ave. Indianapolis, Ind.

Parts and Accessories FOR SALE

RACING CHASSIS FOR SALE—JUST overhauled; very fast; five-speed transmission; \$510. Write for specifications. Hugh F. Hunter, Owensboro, Ky.

Cars Wanted

WANTED—FORD CARS. WE WILL PAY cash for Model T car regardless of condition if the price is right; wrecks preferred. Towle & Loveland, Rockford, Ill.

WANTED—TO TRADE 160 ACRES OF land in Colorado for 1914 6-cylinder touring car. Chalmers or Buick preferred. G. W. Allen, Portland Mich.

Parts and Accessories WANTED

WANTED—NEW 1914 MODEL "T" FORD touring car body complete; state price and particulars first letter. Lock Box 152, Bloomfield, Iowa.

WANTED TO BUY A GOOD 4 CYL. OR 6 cyl. gasoline motor. Greer College of Motoring, 1456 S. Wabash Ave., Chicago.

Situations Wanted

A MARRIED MAN TWENTY-FIVE YEARS of age desires a position as traveling representative in southern California for a manufacturer or jobber; I can furnish a car if it would be of any advantage in the territory that might be assigned to me. Reply before April 20, as I leave on the 25th. Address Box E, 89, c/o Motor Age.

EXPERIENCED SALESMAN, HAVING eight years' experience selling automobiles, desires to connect with a distributor who would appreciate the services of a business producer. A-1 references. Address Box E 17, care Motor Age. b

POSITION WANTED AS DEMONSTRATOR or driver; eight years' experience; age 21; single; can furnish the very best of references. V. D., box 247, Paw Paw, Mich.

POSITION AS CHAUFFEUR—PARTIES desiring sober, reliable man, 5 years' experience. Drive or repair any make. Furnish best of reference. Touring preferred. Unmarried. C. E. T., Box 113, St. Elmo, Ill.

YOUNG MAN WANTS POSITION AS AU- tomobile demonstrator, salesman or repairman for southeastern Europe and Asia Minor; good knowledge and experience; A-1 reference. Address E. Mateff, 1184 Russell St., Detroit, Mich.

YOUNG MAN, 27, SINGLE, RECENTLY out of college, would like position as demonstrator or salesman with factory branch or sales agency where there is a chance for advancement. Have been driving own cars for the last five years. Four years business experience before going to college. Address Box E 47, c/o Motor Age. h

WANTED—POSITION AS AUTOMOBILE repairman; 3 years' experience; western Iowa or Nebraska preferred. Address Box E 88, c/o Motor Age. r

Help Wanted

SALESMAN WANTED—IOWA DISTRIBUTOR wishes experienced salesman to demonstrate and contract to dealer. Best selling light weight six-cylinder, six-passenger, low-priced car. If you can produce results write, giving age and past experience with full particulars. Applications strictly confidential. Address Box E 86, c/o Motor Age. f

WANTED—A REPAIR MAN, MUST UN- derstand electric lighting and starters; state age and experience; western Iowa. floaters need not write; reference. Address Box E 87, c/o Motor Age. r

WANTED—FIRST CLASS DRAFTSMEN experienced in automobile work. State previous experience, salary expected and references. Apply to Chief Engineer, International Harvester Corporation, Akron, Ohio.

WANTED—FORD REPAIRMEN; TWO Ford repairmen that can go ahead with any part of the work; must be fast and accurate; if you can fill the bill we have a good steady job and will pay your price; send references with age, nationality and amount you are willing to work for to Towle & Loveland, Rockford, Ill.

Business Opportunities

AN UP TO DATE GARAGE BUSINESS with tools, gasoline filling station; time on lease 3 years. Shop, tools and complete line of supplies, all on business street of town. Garage room for 30 cars. Address Box E 67, c/o Motor Age. l

AT YOUR OWN PRICE—A LARGE BRICK church centrally located in a thriving western Iowa city of 6,000. County seat and college town. Wealthy farming community. Would make a splendid garage. A church out in the dwelling portion of the city is being built. The present large church is offered cheap and immediate possession given. Fred Evans, LeMars, Iowa.

BUSINESS CHANCES—AUTO AND GEN- eral repair business in Indiana city, population thirty thousand. Equipment complete, machine shop. Well known. Central. Address Box E 68, c/o Motor Age. t

FOR SALE—AN UP-TO-DATE AUTOMO- bile and garage business in a live Illinois town of 2,000. Only garage; fully equipped repair department; full line of supplies and accessories; doing excellent business; well established; will sell at invoice; good opportunity for some one. Address Box E 85, c/o Motor Age. f

FOR SALE—GARAGE AND COMPLETELY equipped machine shop, building, ground and tools, for \$3,400; no trades. For particulars write Jos. Slagel, Fairbury, Ill.

FOR SALE—FIRST CLASS GARAGE AND accessory store located in a live town in the Sunny South; doing good business every day of the year. Have agency for the Ford, Paige and Chalmers. Best three sellers in the United States. Sold 70 Fords last year. Have better prospects this year. An investment of \$8,000.00 will earn three to five thousand per year net. Full investigation permitted. Address Box E 77, c/o Motor Age. t

FOR SALE—GARAGE IN GOOD SOUTH- ern Iowa town; 2 trails pass the door. Cement building 42x65; steam heat. Doing a good business. Good reason for selling. Address Box E. 70, c/o Motor Age. m

FOR SALE—LARGEST AND BEST equipped garage in Southern town of 40,000 doing large winter tourist business, well equipped repair shop and vulcanizing plant. Storage capacity of 80 cars. Poor health, reason for selling. Address Box E. 56, care of Motor Age. p

FOR SALE—MOST MODERN FIREPROOF garage in northern Minnesota; machine shop in connection; business good. Address Box E 90, c/o Motor Age.

FOR SALE—UP TO DATE MODERN GA- rage and auto supplies. Address Box E 11, c/o Motor Age.

I HAVE PATENTS AND A WORKING model of a one cycle gas-engine. Need capital to launch proposition. Model will speak for itself. Inquire of V. C. Decker, Paw Paw, Mich.

MOTOR AGE

Classified Columns

*The Trading Center of
the Motor Car Industry*

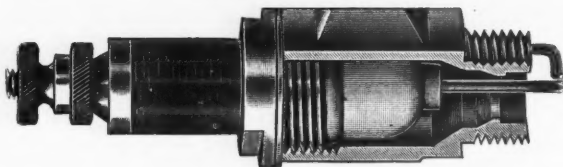
Motor Age is read once a week by more people who own, sell, handle or manufacture motor cars and accessories than any other publication in the country.

Motor Age carries more Classified Advertising week in and week out than any other motor car publication. The cost is small, the chances for returns unexcelled.

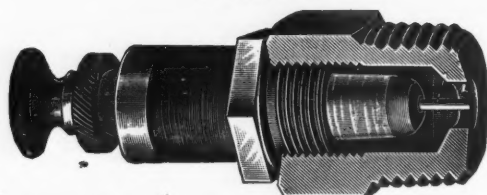
An advertisement in MOTOR AGE is 100 per cent efficient.

THE OAKES & DOW CO. SPARK PLUGS

SOOTLESS



COMET



For Highest Compression Engines
In an actual test of 12 best known makes of plugs, our "Sootless" made good—the other eleven could not stand up.

MANUFACTURED AT

15 Chardon Street BOSTON, MASS.

"WHITNEY" Silent Chains

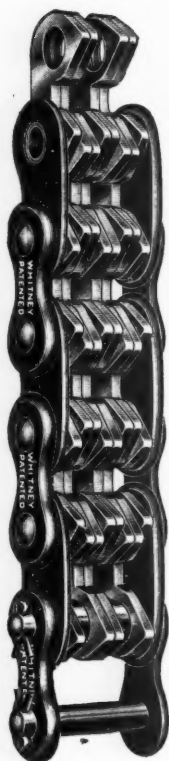
For driving Cam Shafts, Magnetos, Lighting Systems, Generators, Pumps, Self-Starters, etc.

If you are contemplating the use of silent chains, don't fail to try the "Whitney." We have made chains for years and have the most complete and modern factory of its kind in the country.

We have completed a large addition to our factory and are now prepared to make prompt delivery.

Send for catalog D, it contains useful data and information for engineers and designers.

The Whitney Mfg. Company
Hartford, Conn.



Index to the

A

Aeme Torsión Spring Co... 91
Adams & Westlake Co... 80
Adamson Mfg. Co... 95
Alma Motor Truck Co... 96
Apperson Bros. Automobile Co. 91
Atwater Kent Mfg. Works 97
Automobile Blue Book Pub. Co... 48

B

Bartholomew Co. 81
Beach, T. C., Auto Turntable Co... 108
Benham Mfg. Co... 96
Bosch Magneto Co... 3
Braender Rubber & Tire Co. 97
Brennan Motor Mfg. Co... 94
Bretz, J. S. Co... 1
Brietson Mfg. Co... 89
Bridgeport Brass Co... 97
Briggs-Detroit Co... 94
Broderick & Bascom Rope Co. 89
Brown Co... 88
Buda Co... 83
Byrne, Kingston & Co... 96

C

Cadillac Motor Car Co... 50
Cartecar Co... 93
Chadwick & Trefethan... 108
Chester Demountable Rim Co. 94
Chicago Automobile Supply House 108
Classified 109
Class Journal Co... 64b-64d
Clearing House... 101 to 108
Cleveland-Canton Spring Co. 74
Connecticut Tel. & Elec. Co. 87
Continental Motor Mfg. Co. 96
Convertible Auto Body Corp. 86
Corbin-Brown Speedometer 111
Corcoran Lamp Co... 95
Covert Motor Vehicle Co... 94
Cox Brass Mfg. Co... 85
Crown Prince Metal Wks... 92
Cullman Wheel Co... 108

D

Daniels, Smalley... 98
Dann Oil Cushion Spring Insert Co... 66
Dayton Rubber Mfg. Co... 97
Detroit Steel Products Co.. 98

E

Eagle Oil & Supply Co... 83
Eisemann Magneto Co... 94
Empire Automobile Co... 94
Essenkay Products Co... 96

F

Fedders Mfg. Co... 95
Firestone Tire & Rubber Co. 52
Ford Motor Co... 94

G

Gabriel Horn Mfg. Co... 81
Golden, Belknap & Swartz Co. 97
Goodrich, B. F. Co... 73
Gould Storage Battery Co.. 82

H

Ham, C. T., Mfg. Co... 96
Hartford Suspension Co... 2
Haynes Automobile Co... 94
Haywood Tire & Equipment Co. 87
Headlight Support Co... 51
Herz & Co... 89
Holley Bros. Co... 45
Hotel McAlpin... 84
Houk Mfg. Co... 64e
Hoyt Electrical Instrument Works 108
Hupp Motor Car Co... 97
Hyatt Roller Bearing Co... 62

J

Jeffery, Thomas B., Co... 68
Jiffy Auto Curtain Co... 70
Jones Electric Starter Co.. 97

Advertisements

K

K-W Ignition Co.....	78	Robbins, Irvin & Co.....	95
Kellogg Mfg. Co.....	72	Romort Valve Co.....	57
Kimball Tire Case Co.....	95	Rutenber Motor Co.....	98
Kissel Motor Car Co.....	75		
Klear Vieu Co.....	93		
Knox Automobile Co.....	92		

L

Laidlaw Co.....	67	Salisbury Wheel & Mfg. Co.	99
Lexington-Howard Co.....	100	Saxon Motor Co.....	65
Lincoln Highway Assn....	92	Schrader's, A., Son.....	100
Lovell-McConnell Mfg. Co.	47	Searchlight Gas Co.....	98
		Shaler, C. A., Co.....	76
		Sheldon Axle Co.....	100
		Speedwell Motor Car Co..	77
		Spicer Mfg. Co.....	96
		Splitdorf Electrical Co....	91
		Standard Oil Co.....	100
		Standard Woven Fabric	

M

M. & M. Sales Co.....	92	Co.	Cover
Manzel Bros. Co.....	71	Star Ball Retainer Co....	100
Maxwell Motor Co..Back Cover		Sta-Tite Packing Ring Co..	88
Mayo Mfg. Co.....	80	Steam Carriage Boiler Co..	108
Mercer Automobile Co....	98	Stearns, F. B., Co.....	58
Metz Co.....	98	Stewart-Warner Speedome-	
Moline Automobile Co....	99	ter Corp.....	59
Mosler, A. R., & Co.....	63	Stromberg Motor Devices	
Motor Car Supply Co.....	108	Co.	98
Motsinger Device Mfg. Co.	90	Superior Motor Specialty	
		Co.	97

N

New Departure Mfg. Co....	88	Troy Wagon Works Co....	90
N. Y. & N. J. Lubricant Co.	96	Tuthill Spring Co.....	85
Nordyke & Marmon Co....	100	Twitchell Gauge Co.....	99

O

Oakes & Dow Co.....	110	Valentine Co.....	60
Oxygen Decarbonizer Co..	99	V-Ray Co.....	90
		Vulcan Mfg. Co.....	99

P

Paige-Detroit Motor Car		Ward Leonard Electric Co.	100
Co.	99	Warner Gear Co.....	93
Pederson Lubricator Co....	93	Warner Mfg. Co.....	95
Pennsylvania Rubber Co..	64	Weed Chain Tire Grip Co..	112
Positive Supply Co.....	84	Weston Electrical Inst. Co.	91
Premier Motor Mfg. Co..		Wheeler & Schebler.....	46
.....53 to	56	White, The, Co.....	4
Prest-O-Lite Co.....	79	Whitmore Mfg. Co.....	95
Prosser, Thos., & Son.....	95	Whitney Mfg. Co.....	110
Pullman Motor Car Co....	64a	Willard Storage Battery	
Pyrene Mfg. Co.....	82	Co.	49
		Willys-Overland Co.....Cover	
		Winton Motor Car Co....	99
		Wisconsin Motor Mfg. Co..	100
		Wizard Motor Co.....	98

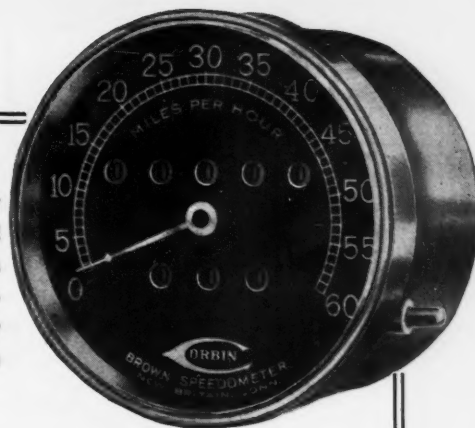
R

R. I. V. Co.....	69		
Remy Electric Co.....	90		
Republic Rubber Co.....	99		
Richard Auto Mfg. Co....	61		

Z

Zenith Carburetor Co.....	86
---------------------------	----

Built by
mechanical
experts on a
principle en-
dorsed by
science—The



CORBIN-BROWN SPEEDOMETER

"The Speedometer of Absolute Accuracy"

Represents the highest development of speedometer construction.

The superiority of the Corbin-Brown principle—*Centrifugal*—is becoming more and more apparent in the light of time and experience. This is evidenced by the fact that every month the Corbin Screw Corporation is increasing its factory capacity in order to meet the constantly increasing demand. The reasons for this are many:—

1st—The Centrifugal principle lends itself to a particularly simple mechanical treatment and simplicity spells efficiency in mechanical construction.

2nd—It has been proved repeatedly that a speedometer constructed on this principle is not subject to inaccuracies resulting from climatic variations or electrical influences.

3rd—The Corbin-Brown flexible shafting is an exclusive feature of the Corbin-Brown Speedometer and is the strongest shafting made. It reduces friction and withstands wear.

4th—The Corbin-Brown has a 100,000-mile season odometer, a 100-mile trip odometer, in instantaneous reset.

5th—The hand of a Corbin-Brown is steady on the roughest road; its dial is at all times quickly and easily read.

6th—The Corbin-Brown guarantee is honest and fair and protects the owner for one full year of service.

The automobilist's confidence in the Corbin-Brown Speedometer increases with the miles it records.

Specify the Corbin-Brown—write for 1914 catalog.

The Corbin Screw Corporation
THE AMERICAN HARDWARE CORPORATION
Successors

New Britain, Conn.

BRANCHES: New York Chicago Philadelphia



A VISION
of your car,
disastrously skidding
on the slippery turn ahead — **You** have neglected to put
on Weed Chains.

You anxiously view the slippery turn ahead and have *a mental picture of your car skidding into the school children.*

Stop nursing anxiety and coaxing calamity. For Safety's sake
—for your own peace of mind fully equip your car today with

Weed Anti-Skid Chains

The Only Real Safeguard Against Skidding

Safety demands that all tires be equipped with Weed Chains. It doesn't require the gift of second sight to see why this is true. **Rubber slips—never grips.** Rubber will agree to anything the road has to offer. It is the weaker element. It slides on wet pavements like a cake of soap rubbed on the moistened hands. Rubber lacks the bite-and-hang-on ability to prevent skidding.

Weed Chains are diamond hard—many times harder than their opposing element the pavement or road. Wheels equipped with Weed Chains automatically lay their own traction surface. Friction is effected without affecting the tires. They grip without grinding—hold without binding. **No matter how muddy or icy the road,** they hold on like a bull dog, prevent side-skid and drive-slip.

Weed Chains are attached without any jacks. You lay the chain over the wheel, with the hooks at the rear. Tuck the slack end under the front of the wheel. Run the car forward until the wheel clears the end on the ground. Draw the chains together, hook the hooks in the end links and **the thing is done.**

Sold for ALL Tires by Dealers Everywhere

Weed Chain Tire Grip Company

Bridgeport,

Connecticut

Manufactured for Canada by

DOMINION CHAIN COMPANY, Limited—Head Office: Shaughnessy Bldg., Montreal, Can.



Overland



Careful Inspection Insures Long Life and Perfect Service

EVERY important part of every Overland car, no matter how small or comparatively unimportant its function, must be accurate to one-thousandth of an inch before it is declared O. K. and allowed to go to the assembling department.

The picture above shows how the steel bushings which are used in Overland fly-wheels are tested for size.

Two gauges are provided for each surface of the bushings. One is of the exact size required, and is marked "Go." The other is one-thousandth of an inch larger and is marked "Not Go."

The "Go" gauge must just slip in or over the surface to be tested. If the part

will take the "Not Go" gauge it is discarded. Anything that is not exactly accurate must go to the scrapheap.

This minute precision insures not only long life but constant satisfactory service. Without such accuracy, the misfit parts would break down or wear out quickly.

You probably never thought we took such extreme care in manufacturing such a comparatively insignificant part.

Overland cars are as closely guarded in every stage of their manufacture as the highest-priced cars made.

And the Overland costs far less than any other car at anywhere near its value. We buy materials in vast quantities and our manufacturing costs are divided by 50,000, our annual output of cars.

Write for our catalogue and descriptive literature. Please address Dept. 46.

\$950

Completely Equipped
f. o. b.
Toledo, Ohio

The Willys-Overland Company
Toledo, Ohio

Manufacturers of the famous Overland Delivery Wagons, Garford and Willys-Utility Trucks. Full information on request.

\$1075

With electric starter
and generator, f. o. b.
Toledo, Ohio

Maxwell 25*750.

The Great Maxwell "Domain"

¶ The man who can take his happy family in his own pretty car and drive away to the wild and rugged places is master of all he surveys.

¶ The supreme sense of ownership which comes to the man who owns the highways and enjoys them gives an inexpressible satisfaction. But the man who owns a MAXWELL "25" has that satisfaction coupled with superior motor car efficiency.

¶ THE MAXWELL "25" is as sturdy as the most expensive car and costs but a trifle more than the cheapest. It is the supreme expression of American manufacturing genius and is sold in train-load lots in almost every state in the union. There's a MAXWELL DEALER near you. He will be glad to show you this greatest motor car value. Look it over. Try it. Benefit yourself and win the gratitude of your loved ones by owning one—it is the kind you can afford to keep.

Maxwell Motor Co., Inc., Detroit, Mich.

